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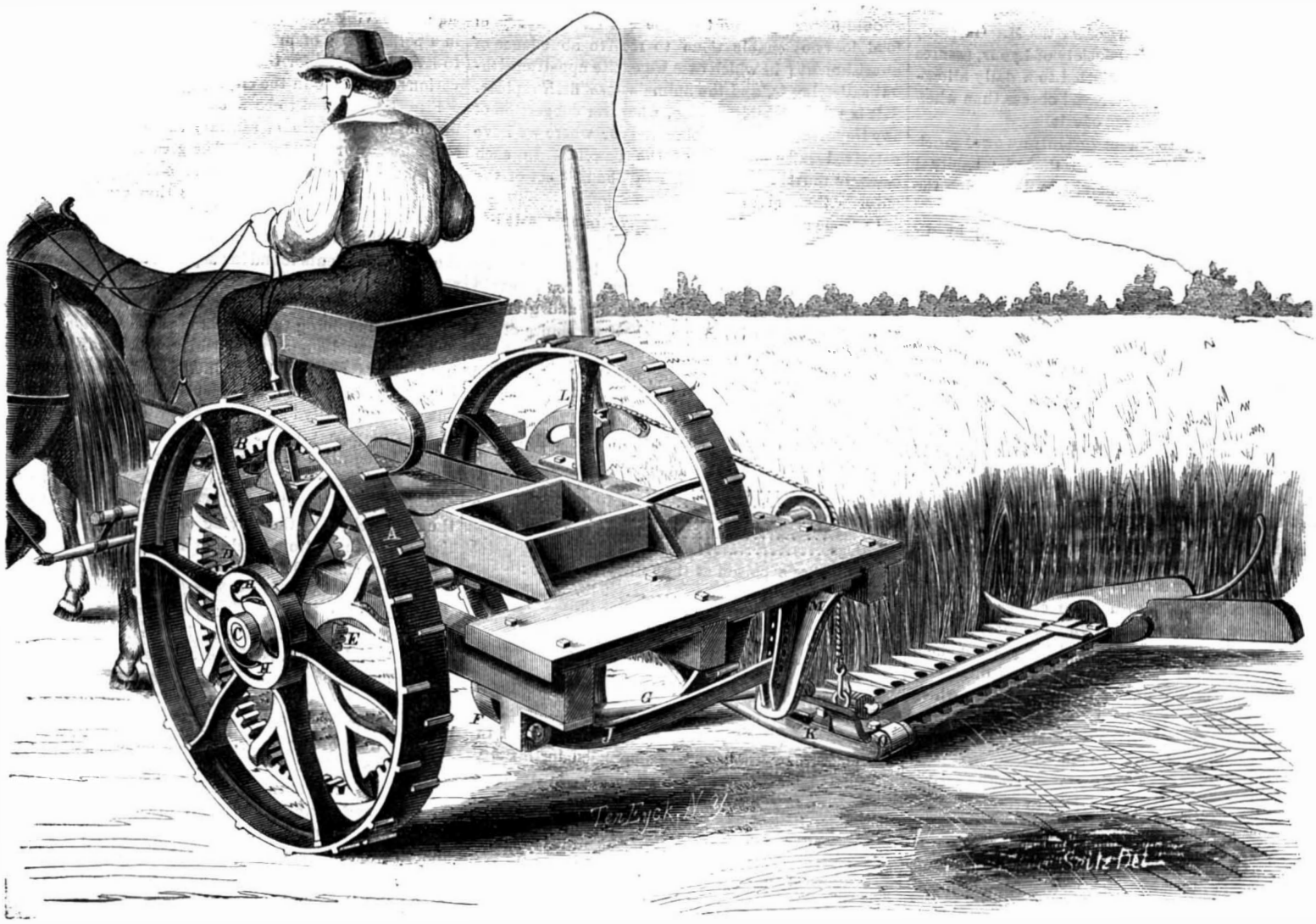
Improved Mowing and Reaping Machine.

When it was first proposed to do the work of the hay field by machinery, nearly every one outside of the inventive world deemed it his special duty to scout the thing as impossible and absurd to the last degree. Scarcely was the idea broached, however, than the patient inventors set their wits to work, and as a consequence, there are quantities of mowing machines in the market, for each of which there is claimed some special excellence. The croakers find their prophesies falsified, and themselves laughing-stocks; while the farmer enjoys very greatly the relief from the arduous labor entailed by the duty in question.



KEYSTONE MOWING AND REAPING MACHINE.

The machine herewith illustrated is of the class known as "side drafts," having the cutter playing between shields arranged and shown projecting from the side of the mower. The machine has large traction wheels, A, which are peculiar in their construction; they constitute one point covered in the patent claim. The body of the wheel is similar to all others, having an internal wheel, B, fastened to the main shaft, C, by which the cutters are driven through the intervention of the pinion, D, which is on the same shaft with the bevel gear, E; the latter meshing into a small pinion not seen in the engraving; it is on the same shaft as the crank wheel, F. To the latter is attached to the connecting rod, G, driving the cutter bar. It will be noticed that the wheel hub is open, and that two palls, H, are fitted inside, having small springs on their back to keep them up to their work. The hub of the traction wheel is made unusually large, and has a series of ratchet teeth cast inside, in which the palls set. By this arrangement the wheels move the main shaft only, when the machine advances; immediately upon backing, the palls slip over the teeth and the gearing does not work. The handle, I, at the driver's side, is for the purpose of throwing the pinion out of gear with the bevel wheel, E. The cutter bar and fixtures are carried at the back of the machine by the flat bar, J, and is also braced by a spring rod which takes hold of the shoe, K, at its forward side; this rod ends in an india-rubber cushion, confined in a cylinder, so as to act as a spring and prevent damage to the machine in case of sudden contact with an unyielding object. The vertical lever, L, has a cord attached which runs over a pulley at the back and is attached to the small staple; this is for the purpose of raising the cutters and fixtures when desired to clear obstacles, and the holes in the hanger, M, admit of a suspension of the apparatus, if desired.

On close examination it will be seen that the cutter bar is received by the shoe, K; the cutter bar fits the shoe snugly between two jaws, O, and by the simple removal of a small pin (behind the hanger in the engraving) the cutter bar can be removed and laid on the back of the machine, and thus easily transported to or from the field. There is also a reel shaft and fixtures accompanying this machine, but it has been omitted in our engraving, as not forming a special feature of the invention. The large traction wheels on this machine give it very easy draft, and the arrangement of the gearing, &c., for driving the cutter bar, as also the apparatus for disconnecting it from the main driving gear, and the ratchet attachment in the wheel, constitute striking and useful novelties. Two patents have been issued on this invention, bearing date Oct. 4, 1859 and June 3, 1862. Further information can be had by addressing the patentee, Mr. David Zug, Shaefferstown, Lebanon Co., Pa. The patentee wishes to dispose of territorial rights.

FAST STEAMBOATING.—The *Daniel Drew*, a fast steamer on the Hudson, is said to have recently achieved 16 miles in 86 minutes. This statement is almost incredible.

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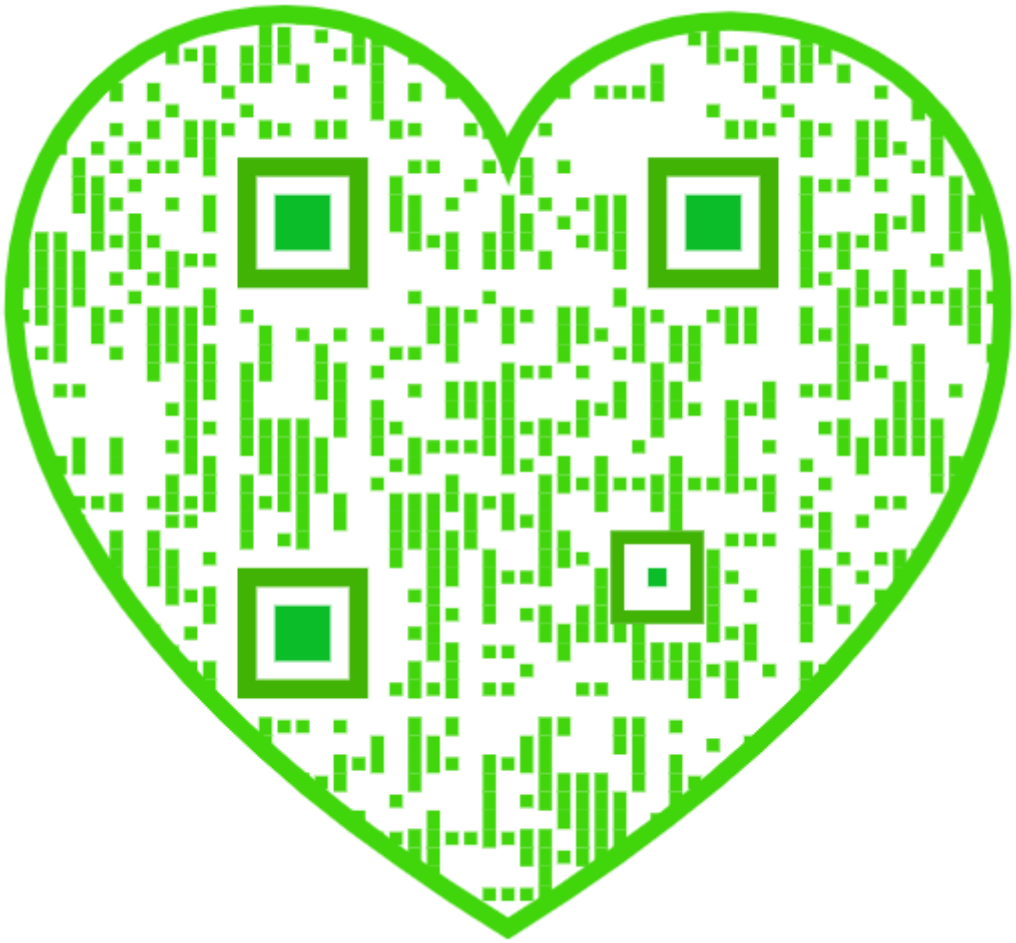

USE OF SALT IN THE FOOD OF CATTLE.

The following are extracts from a recent prize essay on common salt, by Dr. Phipson, of England :—

The use of salt in the food of cattle must not be looked upon as a direct producer of flesh, so much as a necessary element of the economy, without which animals are apt to perish from disease, but with which the body is kept in a normal and healthy state. Not many years ago a German agriculturist, Uberacker, brought forward an experiment which is in direct accordance with this opinion. Wishing to obtain some exact notion of the influence which salt exercised upon his sheep, the flocks of which lived upon a low, damp pasture-land, and received habitually a certain dose of salt, he fixed upon ten sheep, and struck off their usual allowance of salt. This remarkable experiment was continued for three years, with the following results :—In the first year five of the ten died of rot and worms ; in this year the remainder of the flock, 450 head, lost only four sheep. The second year a new lot of ten sheep, deprived of salt, lost seven individuals ; the remainder of the flock, 364 head, lost five only ; a little later, the other three died also from diarrhea. The third year was very rainy. Sixteen sheep were selected, and deprived of salt. The whole of them died in the course of the year of rot and vermicular pneumonia.

In the Brazils and Columbia, flocks may be annihilated by being deprived of salt. M. Garriott, member of the Agricultural Society of Lyons, assures us that the milk of cows subjected to a daily allowance of salt is richer in butter and cheese than when these same cows are deprived of salt.

Sir John Sinclair, to whom agriculture owes much useful information, has observed that the habitual use of salt has a marked influence in improving the quantity and the quality of the wool of sheep.

Many English agriculturists have proved, by direct experiments, that a regular distribution of salt to cattle is especially useful in preventing hoove (meteorization), caused by feeding cattle with leguminous vegetables. And there exists no doubt among those who have tried it, that when employed in proper quantity it increases the appetite, stimulates digestion, keeps up the normal supply of salt in the blood, improves the wool or hair of the cattle, prevents disease, and, moreover, enables the agriculturist to fatten cattle upon food which they would not enjoy without it were previously mixed up with salt.

But there is another important consideration with regard to the regular distribution of salt to cattle : namely, its influence in preventing disease. Its daily use becomes of serious consequence when flocks and herds are menaced with those epidemic attacks which too frequently ravage a whole country at once, when a proper use of salt would either prevent them entirely, or at least reduce them to less disastrous proportions. During one of these epidemics, which sprang up about the year 1840, in the East of Europe, the almost wild cattle of the Ukraine, Podolia and Hungary, were struck down in much greater numbers than those of Silesia and Bohemia, where the cattle-breeders habitually distribute salt to their beasts. Advancing towards the West, this scourge diminished in intensity, and finally ceased to show itself in Germany, where particular care is bestowed upon cattle, and where salt has been for many years constantly employed.

In Great Britain, in the best-farmed districts, we find the allowance of salt oscillating around the subjoined figures, taken as a center of basis :—

ALLOWANCE OF SALT PER DIEM.

Calf, six months old	1 ounce
Bullock or cow, one year old	3 "
Oxen, fattening	6 "
Milch cow	4 "

HORSES.—It is generally admitted, wherever salt forms habitually a portion of the horse's diet, that this animal amply repays the slight additional expense or trouble thus incurred. To mix salt with the food of the horse, colt, ass or mule, is a frequent practice in England and America. In these countries the usual allowance for a full-grown horse of middle hight, is about 2 ounces per diem. In Belgium, the quantity of salt appropriated to a full-grown horse by the Government is little more than 1 ounce per diem.

SHEEP.—The Romans gave to their flocks of sheep, every fifth day, an allowance of salt amounting to about half an ounce per head ; and this is precisely the quantity which is still employed in England and Saxony daily, for sheep full-grown and of ordinary size. Numerous experiments have proved that salt is more beneficial to sheep than to any species of cattle.

PIGS.—The best proportion to adopt as a basis appears to be about two-thirds of an ounce per diem for full-grown pigs.

In administering salt, unless it be used as medicine, the more intimately it is mixed with the food, the better. This is not an easy matter with fodder, especially that which has been salted to preserve it, in which case we must endeavor to make a rough estimate of the amount of salt in a given weight of fodder, in order not to administer an injurious excess. In farms where oil or rapecake is given in powder, this being rather an indigestible food, the allowance of salt should be mixed with it, in preference to any other fodder.

It should be borne in mind that an excess of salt is injurious to any animal ; and that is why the preceding figures are given as a kind of practical guide. An excess of salt produces irritation and inflammation of the mucous membrane, and causes several kinds of skin disease, especially in sheep. With horses an excess of salt has been known to produce dysentery ; and in oxen diseases of the blood. Salt should never be given to cattle when a deficiency of food does not enable them to receive abundance of nourishment ; in which case we excite appetite without satisfying it, and the animals lose flesh rapidly. Salt is to be prohibited, also, wherever congestion of any important organ is observed, or where we have perceived inflammation of the bowels. In such cases we must not be guided by the instinct of the animals themselves.

In some diseases of the digestive organs salt has proved beneficial. Thus, in cases of rot in the liver, accompanied by loss of appetite, paleness of the membrane, swellings under the throat, avoid ground which communicates the rot, and give the sheep five grains of iodine and half an ounce of the spirits of turpentine twice a day, and let them have free access to salt. And again, for the disease called "red water," a species of dropsy, give liberal supplies of food, a dry resting place and rocksalt.

Considered as a medicine, salt purges animals at the following doses :—

Horses	8 to 10 ounces.
Oxen	10 to 16 "
Sheep	2 to 3 "
Pigs	2 to 3 "
Dogs	1 to 2 "

It becomes a poison at the following doses :—

Horses	2 lb.
Oxen	3 lb.
Sheep	6 to 8 ounces.
Pigs	4 to 6 "

Manufacture of Fire-clay Articles.

On page 217, Vol. VII (current series), SCIENTIFIC AMERICAN, we gave a very full description of the manufacture of fire bricks as conducted in this city, which has been generally read with much interest. A paper upon the subject of fire-clay articles was read by Joseph Cowen, jr., before the British Association of Science, giving an account of the fire-clay manufactures in the district of Newcastle. From this paper we condense some extracts of general interest. Silica and alumina are the two substances of which fire-clay is chiefly composed. It generally contains small portions of the oxide of iron, lime, and magnesia, but the best descriptions, capable of resisting the greatest degree of heat, contain about 83 per cent of silica, and about 20 of alumina. At present there are about 80,000,000 of fire-bricks made annually in the Newcastle district (43,000,000 of which are used in the neighborhood), 12,000 fire-clay retorts for gas works, and of glazed pipes from 3 to 15 inches in diameter, 175 miles in length. No less than 150,000 tuns of coal are required to burn these articles in the kilns.

Articles intended for ornament, as well as goods designed for the most substantial works, have been alike constructed from fire-clay with success, and hence also its use as an article of commerce is daily increasing. Gas retorts made of fire-clay within the last twenty years, have gradually been adopted, and they are now generally in use in all gas-works. The improvement in the manufacture of this class of fire-goods has been very considerable. Great difficulties were experienced at first in making retorts of fire-clay of the required dimensions, and free from cracks ; but as the trade extended these difficulties decreased, and the demand for the article increased. All large gas establishments have been enabled, by the use of clay retorts instead of iron ones, to considerably increase their profits. The use of clay retorts has, however, diminished the number of fire-bricks, tiles, and the various smaller kinds of fire-goods formerly consumed by the different gas companies in setting their iron retorts.

Fire-clay pipes are now often used for lining chimneys in dwelling-houses, hospitals, &c. The use of such pipes as safeguards against fire cannot be too highly recommended. Fire-clay is also largely used for making chimney-tops, baths, flower vases, and other ornamental articles. Many of the common and lowest-priced descriptions of fire-bricks are now used for ordinary building purposes, in the construction of dwelling-houses, warehouses, &c.

Fire-clay has, for some years past, also been used extensively in the manufacture of sanitary pipes, for which purpose it is well adapted. The smaller main sewers and branch drains in all new works are now made of glazed fire-clay or earthenware pipes. Clay pipes, although in their adaptation to drainage comparatively modern in their use, are yet of great antiquity, having been found in the ruins of Nineveh in a perfect state of preservation, where they appear to have been used for the conveyance of water to the various aqueducts in the city.

Fire-clay is found to be a more suitable material for the manufacture of sanitary tubes than either earthenware or stoneware. The greater amount of heat that is required to vitrify it makes the pipes better burnt ; while the thickness they are usually made increases their strength and durability, and at the same time enables them to resist the action of the chemical agents found in suspension in the liquid sewage.

At an early period of their manufacture, the old system of moulding these pipes in plaster molds was abandoned, and a more expeditious method of making them was adopted, by the introduction of suitable machinery, in some cases propelled by hydraulic, but more generally by steam power. The usual form of a steam-pipe press is a simple cylindrical box, which, being filled with properly-tempered clay, has a ram or plunger working in it, which, being set in motion by the direct action of steam, admitted to the steam-chest by the moving of a handle, presses the clay to the bottom of the cylinder, through dies of various sizes. The socket and the pipe being made simultaneously at one blow, and the pipe being cut with a wire, is carried off on boards to stiffen ; after which a slight dressing by hand makes it ready for the kiln, where it is burned. The rapidity with which these pipes are made is very great—five men or boys being able to turn out about a mile of them in a day, from 3 to 6 inches in diameter, of 2 or 3 feet lengths ; or a proportionate number of larger sizes. The highest bore these pipes have reached is 3 feet diameter, but these are very seldom used, being found more expensive than a brick drain of the same dimensions ; but 18 inches diameter pipes and under, are the sizes used most, generally for main and side drains. In addition to their cheapness, these pipes are found of almost universal adaptation, from their internal smoothness and cylindrical form. When properly laid and well-jointed, a fall of an inch in 1000 yards will enable the sewage to flow through them without stagnation or interruption. These pipes are all glazed externally and internally with a powerful salt glaze.

THE APPLE TRADE.—The apple trade of Western New York this year is very extensive. The Lyons *Republican* says :—"The price paid for fall fruit is about one dollar per barrel, the purchaser furnishing the barrel. Winter fruit will bring a higher price, probably. It is believed that more barrels of apples will be shipped from Wayne county this year than ever before, although the crop is considerably smaller than that of last year. West of the Genesee river, however, the yield is astonishingly large, and Monroe, Orleans, and Niagara counties are sending out thousands upon thousands of barrels of fruit."

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MISCELLANEOUS SUMMARY.

LARGE LOCOMOTIVE.—The largest locomotive in the United States, if not in the world, has just been built for the Philadelphia and Reading Railroad Company. It has twelve driving wheels 43 inches in diameter. The cylinder is 20 inches in diameter, and the stroke of piston 26 inches. The fire boxes 10 feet 8 inches long, and 43¾ inches wide; inside diameter 48 inches. The weight of the locomotive when in running order is 106,320 pounds. This locomotive is intended for a pushing one, to force the heavy coal trains up the grades of the road. It was designed by Mr. James Millholland, formerly of Baltimore, and its construction superintended by him.—*Pittsburgh Chronicle.*

[That's a curious fire-box.—Eds.

NOTHING LIKE LEATHER.—Trimming for ladies' dresses and cloaks, made of leather, is now offered. It is of all widths, cut into patterns from the prepared calf-skin, in its natural color. It is novel and durable. Leather belts, dyed in all colors, ornamented with steel in the similitude of screw heads, &c., with bright steel buckles and mounting, are much in vogue. They are not durable, and unless in the natural russet soon lose their bloom. Bonnets of leather will be shown at the next milliners' opening. The material is precisely like that used for binding books.

[The ladies then are, in bookbinders' phrase, to be "half calf."

A BIG STICK OF TIMBER.—A few days since a splendid stick of white oak timber was landed at the Globe Works, Boston. It was one of the largest ever brought into Boston. It measured sixty-six feet in length, and was hewn up square, on the average, twenty-eight by twenty-nine inches. It contained three hundred and seventy cubic feet, equal to four thousand four hundred and forty feet, broad measure, or nine and a quarter tuns. Its actual weight would not be less than twelve tuns. It was brought from the State of New York.

READING WHILST TRAVELING.—The attention of medical men, both in England and France, has of late been drawn to the ill effects resulting from the habit of reading while traveling by rail. Dr. Legrand de Saulle remarks that reading thus is extremely fatiguing to the eyes, and that this fatigue induces headache, and often pains round the eyes, with a slight congestion of the retina, which, when the habit has become inveterate and the subject is advanced in age, may in the end determine a real congestion of the brain.

SUBSTITUTE FOR PORT WINE —In consequence of the impossibility of procuring pure port wine of the trade formerly issued to the army, an article of Tarragona wine has been adopted for issue instead. This wine is light, dry, and astringent, and is the pure juice of the grape; it is purchased by the Medical Department in bond, and bottled at medical purveying establishments.

HARD UP.—The town of Selma, Ala., had but one male in the place who was competent to act as engineer of their gas works. He was conscripted by the rebel government, and the peoole of Selma are consequently without light. The people have sent a petition to Richmond for the release of the conscript.

PHOTOGRAPHS OF THE MOON.—Dr. Henry Draper, of this city, has taken a photograph of the moon nearly three feet in diameter, made under a power of three hundred and twenty in the telescope. It is the largest that has ever been taken.

CHEAP COAL GAS.—In the city of Liverpool the rice of gas has been reduced to about 86 cents per 1,000 cubic feet. It is also stated that this price pays a fair profit to the stockholders.

THE milk-condensing works in Winsted are now ready to commence operations. They bought six tuns of crushed sugar, to begin with, at only sixteen cents a pound.

THE marriage ring of Martin Luther has come into the possession of a Berlin artisan. The Royal Museum will buy it. There appears to be no doubt of the relic being genuine.

AN exchange says that a church in Prussia, holding one thousand persons, has been constructed entirely —statues and all—of *papier mache.*

PERPETUAL MOTION.—The Kingston *British American* says Mr. C. Carruthers, a mechanic of the Grand Trunk Railway, has, after ten years of thought and labor, discovered the principle of perpetual motion. The model is constructed of eight levers, and each of these levers has a weight attached to it. Seven of these weights are descending while one is ascending. It stands to reason that if we have a weight to lift one hundred pounds, with a lever six feet long, and if you place the fulcrum two feet from the end of the lever, we have four feet of leverage, and a weight fifty pounds will balance the lever.

[Just so! that exactly balances the whole machine, so that it won't run at all for any length of time. Mr. Carruthers has lost ten years of his life in prosecuting a useless idea. A perpetual motion machine as we have repeatedly shown in this journal is the Will-o'-the-Wisp of invention.—EDS.

THE PHOTOGRAPHIC FIXING AGENT.—To fix photographic pictures, a solution of the hyposulphite of soda has been the common agent employed. In this the picture is treated, and is thus prevented from changing. The *Photographic News* asserts that the days of this agent in photography are numbered, and that sulphocyanide of ammonium will take its place as a superior agent, by the use of which a faded positive picture will be unknown. The original source of the cyanide of ammonium is the thick tarry liquid remaining after the separation of the free ammonia from gas liquor: this has long been known to contain large quantities of sulphocyanide of ammonium, but hitherto all attempts to separate it from the impurities which accompany it have failed.

IN THE DARK.—We have received a communication signed E. W., purporting to express the views of the mechanics and civil engineers of Buffalo on "this subject." We have read the document very carefully, but cannot find out what "this subject" means, as the writer goes into so many different ones in his communication that he is like a man asking twenty questions in one breath. We should be very happy to answer the mechanics of Buffalo, or those of other places, any reasonable questions they may propound; but before we give any reply to their queries it is somewhat essential for us to know what they desire to be informed upon.

A NEW KIND OF MACHINERY.—An exchange says that a new machine has been invented for converting parsnips into horse-radish. The inventor is on his way to Washington to procure a patent.

[If some one would go to work and build a machine to convert some of the parsnips and turnips *out* of horseradish prepared for market they would do a good thing. Verily wonders will never cease. —EDS.

THE press used for printing the New Haven *Register* is driven by water power, from Lake Whitney, instead of steam, as formerly. An inch pipe and a turbine wheel is sufficient for the purpose.

THE cup (made out of a cocoa nut) and chest of Alexander Selkirk (Robinson Crusoe) are being exhibited in London.

Account of a Great Balloon.

M. Nadar, the distinguished French artist and photographer, lately made an ascent from the Champs de Mars, Paris, in the largest balloon that ever went upon an aerial voyage. Over 22,000 yards of silk were employed in its manufacture, at a cost of 160,000 francs for the fabric. When the balloon was inflated its height was only fourteen yards lower than the tower of Notre Dame. After one or two unsuccessful attempts, and a consequent delay of an hour and a half, the balloon finally rose slowly, and floated majestically into the air in a northeasterly direction from Paris. Preparations had been made for a journey of four days, but in the course of two hours from the time of starting some disarrangement of the valves, or breakage of the cords, necessitated a descent, which, after some moving incidents, was effected in the environs of Meaux, with no greater material injuries to its crew than a few cuts and bruises. Among the aeronants, whose number amounted to fourteen, were two ladies, the wife of the proprietor and the Princess de la Tour d'Auvergne, wife of the present Ambassador of France to Rome.

Gas Meters.

At a recent meeting of the Scottish Association of Gas Managers, held in Edinburgh, Mr. Robb, of Haddington, gave a summary of his experience in the use of them during the last eight or ten years. He said he was rather partial to the dry meter, and anxious that it should succeed in becoming *the* meter; but he must say that, in its present and previous working, he had found great variation in the registration. Those kept constantly at work he found to give the most satisfactory results; and, contrary to general belief, they were liable to derangement by frost. During the severe winter of 1860-1, one meter (amongst others which were stopped) he examined, and found to contain a considerable quantity of hoar-frost, resulting from the frozen moisture in the gas, and to be otherwise so acted upon as to affect its working.

Mr. Whimster, of Perth, bore a similar testimony. He accounted for dry meters—which were used in shops, offices, warehouses, &c., and standing idle during part of the summer—not working so well as those kept constantly in use, from the fact that dirt and tarry matters deposited on the rubbing services of the valve, from the want of gas passing, and thereby keeping it moist, get hardened; and, on the meter being again set to work, the valve was consequently prevented from fitting so closely to its seat as was required for correct measurement—a thin sheet of gas being allowed to pass without being measured. He also found that the material of which the measuring chambers were made, got hard, and on starting did not distend so freely as when they left the maker, and consequently registered quick. He had tested several dry meters which had been at work for some time, and found them to vary from 25 to 30 per cent slow, and as much fast, which he believed to result from the explanation given.

How the "Leviathan" was Captured.

Sometimes a man shows his smartness by being remarkably stupid; the following case of the engineer of the tug boat *Leviathan* is one in point:—The rebels near New Orleans recently boarded the tug-boat *Leviathan* and carried her out to sea, to make her a privateer. She was captured blockader *De Soto*, and the wonder was how such boat as the former could be overtaken by the latter but this is explained by recent information. The engineer of the *Leviathan* was kept by the rebels in charge of the engines, and, though threatened with death if he failed in his work, he managed to render the machinery comparatively worthless, first, by flooding the boilers with water, then bursting an important pipe, and then turning the surplus water into the hold of the vessel, his idea being to sink the hull so that the fires would be put out. It was these ingenious attempts to circumvent the privateers that enabled the *De Soto* to come up; but for this, the *Leviathan* would probably have escaped to have become the scourge of the Gulf.

The Petroleum Trade.

The Oil City *Register* states that in the month of October, one year ago, the estimated amount of oil on hand there was from 75,000 to 80,000 barrels. Upon Oil Creek the amount of oil in tanks was variously estimated at from 100,000 to 150,000 barrels. At the present time the total amount on hand at that point is about 25,000 barrels; in tanks on the Creek, 40,000 barrels. At about the same time last year the amount of crude oil in tanks at Pittsburgh was estimated at from 75,000 to 100,000 barrels. The estimated amount on hand there at the present time is from 15,000 to 20,000 barrels. In New York city, last October, the amount of oil on hand was estimated at from 75,000 to 100,000 barrels. The estimated amount on hand at the present time is estimated at from 140,000 to 151,000 barrels. The difference between the amount on hand at the present time and at the same time last year is from 120,000 to 150,000 barrels. The daily product of the wells on Oil Creek now is about the same as that of last year, viz: about 6,000 barrels; and the price is $6 25, and $6 50 per barrel in Oil City.

ANTIMONY has been found at South Ham, near Quebec. The discovery is considered of great value and importance.

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THE LABRADORIANS.

The language spoken by the Labradorians of the gulf generally indicates the race from which they or their ancestors originally sprang, although it does not inform us of the place of their birth. The French language is most generally spoken between Mingan and the St. Augustine, while the residents are chiefly of Acadian or Canadian origin, with a few settled fishermen from France. From the St. Augustine to the Bay of Bradore, the English tongue is universally employed; but there are great numbers of the Labradorians who can speak both languages.

The houses of the residents are constructed of wood, brought ready prepared from Quebec, Gaspé or Newfoundland. In process of time limestone, which abounds on the Mingan Islands, and is easily accessible, will be employed by those who can afford that luxury. Writing in 1853, Mr. Bowen, who visited Labrador in that year, states that the largest collection of buildings, sixteen in number, then on the coast, was at Spar Point, the residence of Mr. S. Robertson, in the Bay of Tabatière, 900 miles from Quebec. Generally the settlers live in groups of two or three families, four or five miles apart, each of which constitutes a seal-fishing berth, or pêcherie. In 1861 a great change had already taken place. At Esquimaux Point an Acadian village has sprung up, and some excellent two-storied wooden houses give the appearance of civilization to this once desolate shore. The first family went there four years ago. There are now more than fifty families at Esquimaux Point, or rather Pointe St. Paul, as it has been named by the priest who has lately come to live with the new colonists. They have already cleared and fenced some acres of land, and at the time of my visit in August, 1861, the gardens were well stocked with potatoes, cabbages and turnips. The situation of this new settlement is beautiful, and the back country well capable of sustaining a large number of cattle in the vast marshes at the foot of the hills, which rise in rugged masses a few miles from the

The houses are very neat and roomy; the
I passed the night contained one large
feet square, with a space partitioned off
room; the upper story was divided into
apartments. A stair, or rather ladder, led
dormitories which the younger members of
families tenanted, the parents occupying the
ound floor. The old-fashioned double stove, so
ommon throughout Rupert's Land, was placed in
the middle of the room, and served both for cooking and heating purposes. The floors were neatly boarded with tongued and grooved flooring brought from Quebec, and an air of cleanliness and comfort was common to this as well as to other houses I visited. Alas! it was only an air of comfort and cleanliness, for when I lay down to sleep on an Acadian bed, white and clean externally, it was soon painfully evident that there were hundreds of other occupants, of which the less that is said the better. At this nucleus of a fishing village, which may yet rise to the dignity of a small town, they have already some pigs and sheep, and propose to bring cows from Gaspé or the Magdalen Islands. They enjoy the ministrations of a resident priest, and have a school for the young.

The spring and summer life of the Labradorians is exclusively devoted to fishing. They have no leisure at that period to attend to other occupations, so that it will not be wondered at that until 1860 the only cow on the vast extent of gulf coast east of Esquimaux Point, was at Natagamiou; the happy proprietor obtained but little profit from his charge, for the impression gained ground among the simple people that cow's milk was a cure for all imaginable maladies. From far and near, within the limits of thirty miles on either hand, they sent for a "drop of milk" when sickness was upon them; and as no charge is ever made for such items on this hospitable coast, the owner of the cow had no milk left for himself.

The Acadian colony, near Natishquhan, ninety miles from Mingan, was established in 1857; it already numbers thirty families. Natishquhan is famous for its seals, and it is chiefly for the convenience of catching these "marine wolves" in the spring of the year that the Acadians have permanently established themselves there. From the month of April to the month of November the fishermen of Natisquhan are engaged in fishing, first seals, then salmon, cod, herring and mackerel. They own three schooners, while the more wealthy residents of Esquimaux Point boast of a round dozen. In the rear of this settlement there is abundance of timber for fuel, and a short distance from the shore the trees are sufficiently large for building purposes. Communication between the different settlements on the coast is chiefly by water during the summer, and in winter on snow-shoes or by dog trains.

Each family has generally eight or ten dogs, either of the pure Esquimaux breed or intermixed with other varieties from Newfoundland or Canada. During the summer time the dogs have nothing to do but eat, drink, sleep and quarrel; when, however, the first snow falls, their days of ease are numbered, and the working season begins. The Labrador dogs are excessively quarrelsome, and, wolf-like, always attack the weaker. All seem anxious to take part in the fray, and scarcely a season passes without the settlers losing two or three dogs during the summer from the wounds which they receive in their frequent quarrels among themselves. Confirmed bullies are generally made comparatively harmless by tying one of their forefeet to the neck, which, although it does not prevent them from joining in an extempore scuffle which may spring up, yet so hampers their movements that the younger and weaker combatants have time to escape. Peace is instantly restored among the most savage combatants, even if twenty are engaged in the affray, by the sound or even sight of the dreaded Esquimaux whip used by the Labradorians. Up to the present time, with two or three exceptions, says Abbé Ferland, no settler has succeeded in raising any domesticated animal on account of the dogs; cats, cows, pigs and sheep have all been destroyed by them. Even if a dog has been brought up in the house, his doom is sealed; at the first opportunity, when the master is away, the others pounce upon him and worry him to death. A settler had procured a fine dog of the Newfoundland breed, full of intelligence, and capable, by his extraordinary swimming powers, of rendering great service to the fishermen in the sea. The Newfoundland enjoyed the privilege of entering into his master's house and receiving the caresses of the different members of the family. This evident preference excited deep jealousy in the breasts of the Labrador dogs. They patiently waited for an occasion to avenge themselves. When their master was present, all was fair, open and peaceable; but one day a favorable opportunity occurred, and they fell on the poor Newfoundland, killed him, and dragged his body to the sea. On their return to the house, the embarrassed mien of the conscious dogs led the settler to suspect that something was wrong. He soon missed the pet Newfoundland, and after a few hours discovered the mangled body of his favorite lying on the beach, where it had been left by the retiring waves. Only one pig and one goat escaped the general massacre when Abbé Ferland was on the coast in 1858.

During the winter season the Labrador dogs make a full return to their masters for all the anxiety and trouble they give them during the summer months. Harnessed to the sledge, or commetique as it is termed on the coast, they will travel fifty or sixty miles a day over the snow. They haul wood from the interior, carry supplies to the hunters in the forests far back from the rocky and desolate coasts, merrily draw their masters from house to house, and with their wonderful noses pick out the right path even in the most pitiless storm. If the traveler will only trust to the sagacity of an experienced leader, he may wrap himself up in his bear and seal-skin robes, and defying piercing winds and blinding snow drifts, these sagacious and faithful animals will draw him safely to his own door or to the nearest house. The commetique is about thirty inches broad and ten or twelve feet long; it is formed of two longitudinal runners, fastened together by means of transverse bars let into the runners and strengthened with strips of copper. The runners are shod with whalebone, which, by friction over the snow, soon becomes beautifully polished and looks like ivory. The commetique is well floored with seal skins, over which bear or seal skins are nailed all around, with an opening for the traveler to introduce his body. The harness is made of seal skin, the foremost dog, called the guide, is placed about thirty feet in advance, the others are ranged in pairs behind the guide; sometimes three, sometimes four pairs of dogs are thus attached to one commetique in addition to the guide.

The Esquimaux dog of pure breed, with his strong-built frame, long white fur, pointed ears and bushy tail, is capable of enduring hunger to a far greater extent than the mixed breed. But the mixed breed beat him in long journeys if they are fed but once a day. An Esquimaux dog will travel for two days without food; one of the mixed breed must be fed at the close of the first day or he can do little the next. These powerful, quarrelsome, and even savage animals are kept under absolute control by the formidable Esquimaux whip. Even in the middle of summer, the first glimpse of the whip is sufficient to arrest the most bloody battle. The lash of a good whip is about thirty five feet long, attached to a handle of not more than eight or ten inches. An experienced driver can hit any part of the leader he chooses with the extremity of his formidable weapon. The best whippers are well known on the coast, and to become an experienced hand is an object of the highest ambition among the young men and the rising generation.

Uniform hospitality is the characteristic trait of the Labradorians. With a few exceptions, they are very like one another in their manners and customs. Under many circumstances property may be said to be held in common. When the stock of provisions belonging to one family is exhausted, those of a neighbor are offered as a matter of course, without any payment being exacted or even expected. When a "planter," as they are often termed on the coast, has occasion to leave his house with his family, it is the custom to leave the door on the latch, so that a passer-by or a neighbor can enter at any time. Provisions are left in accessible places, and sometimes a notice, written with charcoal or chalk, faces the stranger as he enters, informing him where he may find a supply of the necessaries of life if he should be in want of them. Father Pinet relates that he came one day to the house of a planter during the absence of the family, and not only found directions how and where to find the provisions, rudely written in chalk, for the benefit of any passing stranger, but one of his party, on opening a box, saw a purse lying quite exposed, and containing a considerable sum of money.

The vice of drunkenness is the only one of which the missionaries complain in their reports. The swarms of American fishermen who come here during the summer months bring an ample supply of whisky and rum for the purposes of trade. It would be a boon to the Labradorians if the importation, in any form, of ardent spirits, were strictly prohibited by the Canadian and Newfoundland Governments. Give these people an ample supply of tea and coffee, instead of infernal whisky, and they will become the happiest colonists on the face of the earth.—*British American Magazine.*

Cure for Nails Growing into the Flesh.

Dr. Gaillet, of Luynes, France, has published an account of the efficacy of the sesquichloride of iron for curing the growth of the toe nails into the flesh, and Dr. Billon, commenting on this subject, says:—"In 1858, Dr. Wahu, staff-physician to the army, having succeeded with this remedy in curing the painful disease in question, I resorted to the same method, and with the greatest benefit in four cases. I may here remark that ulcers about the nails are occasionally observed among our soldiers, having escaped the attention of the medical boards, or being caused by the pressure of the boot during forced marches. Under these circumstances, a prompt and painless cure may be effected by inserting the dry sesquichloride between the nail and the protruding flesh, and powdering the latter with the same substance. A large bandage should be applied over all, not impregnated with the liquid sesquichloride of iron; a precaution which may, however, be useful, as the folds of the band dry rapidly, and preserve their situation in a more exact manner. On the following day the exuberant flesh is found to have acquired the hardness of wood; suppuration speedily ceases, and a cure follows after two or three applications. This simple and mild treatment is obviously far preferable to the numerous surgical procedures hitherto recom-

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mended. In the course of four or five days or in a week at the farthest, the original pain ceases, the swelling subsides and the patient is able to walk. Naught remains but the hardened protruding flesh, which falls away about a month after the application of the sesquichloride of iron. These are the results yielded by this method in four soldiers suffering from the growth of the nail into the flesh."

HOW A RIFLED MUSKET IS MADE AT THE PROVIDENCE TOOL COMPANY'S ARMORY.

When the war for the preservation of the Union first broke out, there were not wanting stout hearts and willing hands to defend our imperilled liberty. So well had the measures of the arch traitors who inaugurated the strife been taken, that when our armies were to enter the field, it was found that hardly a tithe of the required number of muskets were to be had, our usual quotas having been transported South many months previously. In this dilemma the only resource was to look abroad, and large quantities of arms were imported from Belgium, and other countries.

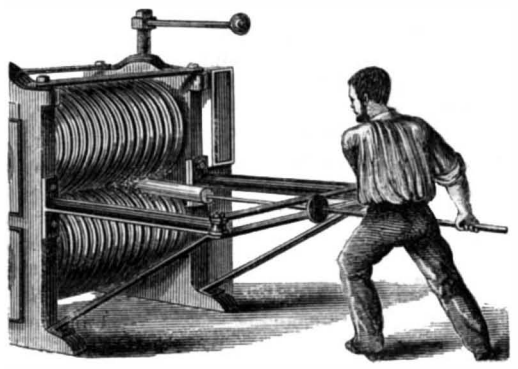
In the meantime the United States Armory, at Springfield, Mass., was urged to its utmost capacity, but in spite of all the strenuous efforts made, the number of guns delivered fell far short of what was required. Here was an emergency wholly unlooked for, but one which the enemy had largely counted on as a means of enforcing his demands. Reduced to one armory, the splendid one at Harper's Ferry with all its costly machinery having been destroyed early in the struggle by our own officers, the only alternative was to call on the mechanical talent of the North to come to the country's rescue. The appeal was not ineffectual, and the results have been an immense number of muskets produced by machines similar to those used by Government with such improvements added as the skill and cunning of the contracting parties could devise. Let us call attention to the above fact and the suggestion it contains. The tools for making guns, or Springfield muskets, are justly celebrated as being the finest and most elaborate of their class; yet important modifications have been made in fabricating delicate parts of the weapon, and the processes themselves greatly expedited by allowing intelligent and skillful men to exercise their ingenuity upon the subject. There are at the present time a large number of private armories engaged on the Springfield arm, under Government contract. We recently visited one of them —the Providence Tool Company's Armory—in Providence, R. I. This company manufactures more of the several parts of the weapon than any other private firm in the country. Other establishments turn out finished guns complete, and up to the Government standard, but they procure, some one part and some another, from different shops and combine the whole in the musket at their particular works. The company that we have individualized makes every part of the Springfield rifled musket except the rear sight; this being a small item is not undertaken, as it can be bought ready-made from manufacturers engaged in its production. The quality of the work done in the Providence Armory is unequalled any where, and we have taken some pains to satisfy ourselves on this point—even rival firms according all praise in this respect with a candor which is highly creditable.

No person, except one who has fully and thoroughly investigated the subject, can have the slightest conception of the character and quality of the work demanded by the Government from parties making the Springfield musket. The most severe and apparently unreasonable tests are exacted, and the finished weapon will bear comparison for accuracy and general beauty of workmanship *with any mathematical instrument ever made.* This is a strong expression, but it is fully borne out by the facts, as the reader can see by reading our description of the Armory.

Let us premise by saying that the Providence Tool Company, like most others who embarked in the business, were entire novices in the art, and when they undertook their first contract were in a state of complete ignorance concerning the character of the work and the requirements of the Government. This no longer exists, owing to the energy and genius given to the task by the superintendent and workmen employed there. As was remarked by a gentleman connected with the armory who kindly showed us through the establishment, "when we came to make the gages we were almost discouraged; the standards are kept at the Springfield Armory, and three separate sets were made to match them; each set being pronounced perfect at the time, but they were afterward sent back to Providence to be reconstructed." When we inform our readers that there are no less than seventy-five different gages, and from two to ten apertures in each gage, the nature of the alteration will be apparent, without further explanation. Three model muskets, or those which are considered to be perfect, and of the exact pattern required, cost the Government $2,500, or over $800 each, to make. From this illustration some conception can be formed of the unapproachable excellence of the Springfield musket as a weapon of war. Some economist with false ideas may here exclaim, "what folly!" and begin at once to elaborate a series of articles on waste, useless expenditure of time, &c., which we herewith affectionately advise him to restrain and listen a moment to our explanation. The excellent quality of the work demanded by the Government has this redeeming feature (if it had no other it would be defensible as authorizing the system pursued), it secures *perfection* so far as human skill is able to attain it. Perfect weapons conduce largely to make efficient soldiers, and lead to victories; when a soldier knows that the gun he carries will never fail him in time of need, that it will not miss fire, but will shoot with unerring precision, and not become disabled with fair usage, then he fights with a determination and energy which he would not manifest with an inferior arm. The mechanical efficiency of infantry depends almost wholly upon their guns; for the bravest men without good weapons or short of ammunition, are no better than a mob before well-armed inferiors. Not only are these moral points secured by the possession of a good arm, but the true principles of economy are embraced in the manufacture of a good weapon of any kind; not only are armies saved from panic or rout caused by worthless weapons, but the arsenals are not full of them requiring repair, and thousands, yea millions, of dollars are annually saved by producing a weapon which is the best that can possibly be made. The people will therefore understand that the Springfield musket is not "a pretty good gun;" but is, both as a weapon of war, and an article of manufacture, wholly unapproachable by any similar musket made elsewhere; not even the Enfield rifle—which is made as near like the Springfield arm as Englishmen can make it, with Yankee machinery and men to instruct them—equals it. There may be some persons ignorant of the fact that in 1855, Jefferson Davis, being the Secretary of War, gave full permission to the English Government to witness all parts of the manufacture, and to construct sets of machinery in all respects similar to our own. This machinery is now in operation at Enfield, England.

While, as has been stated previously, great improvements have been made in musket machinery, we do not desire to be understood as saying that the art has been revolutionized, but that in the essential points of expediting and cheapening the work, a great deal has been done, and much still remains to do. In the construction of a standard piece of work, such as a musket, a sewing machine, watch, &c., a complete and simple order must be observed, so that while the work goes forward with dispatch, there will be no confusion, error, or delay; the latter it is particularly necessary to avoid in making muskets, since the failure to produce certain portions in a specified time precludes the possibility of a weekly delivery. The system observed in the Providence Tool Company's Armory is a most excellent one, mutually advantageous to all concerned, the jobbers, workmen, and the company. Where all parties are pleased it is useless to comment, and we turn without further preliminaries to descend the stairs to the rolling shop, where the first operation of making a musket is going forward. With one hand upon the door knob we must premise by saying that we are indebted to many obliging and ingenious men, foremen and others, throughout the works, for personal attention, explanations, and practical illustration of the several processes. These gentlemen voluntarily left their work (every one works by the piece, be it understood), and courteously pointed out objects of interest. Nothing would afford us more pleasure than to allude to individuals by name, but we beg they will consider the difficulties and embarrassments likely to arise from such a course, and be satisfied with this general recognition of their politeness.

IN THE ROLLING MILL.—



We have the first step toward producing that essential part of the musket—the barrel. In an adjoining storeroom there are huge piles of flat iron continually on hand; these pieces are incipient barrels, and are 12½ inches long, by 5½ wide, and ½-inch thick; they weigh ten pounds. They are the best English iron, imported especially for the work. The plate is formed up by successive operations; at first it is run through what are called the crimping rolls. These are merely cast-iron rollers, with grooves in them of a constantly increasing depth; the first groove being merely a shallow depression, through which the red hot plate is drawn; when it issues on the further side it is curved like an eaves trough; these curves are gradually augmented until the plate is no longer such, but is an irregular cylinder with a seam, or two unlapped edges, all down one side. This seam must now be closed so as to make the barrel continuous and of a solid and homogenous nature throughout. Here the true rolls come into use. These latter are larger in diameter than the crimping rolls, and are arranged one above the other. Now the gun barrel is not straight, but tapers from one end to the other, consequently the grooves in the rolls must be of a constantly increasing depth, so that the barrel will be of the right taper when finished. Very little metal is left on, barely sufficient to turn and grind to a smooth surface; therefore it will be apparent that if the workman does not always insert the barrel at the proper time and always in the same place, the thick part of the butt might be inserted in the narrow end of the groove and the work be spoiled. When the rollers once get hold of the barrel they never relax their grasp, but put the work through to the other side most speedily; there is no alteration or re-adjustment possible. To insure against loss in this respect the rollers are provided with a square jog. The barrel being heated to a white heat in the furnace behind the workman, is then thrust on a steel mandrel, and watching his chance, he pushes the butt of the barrel against the shoulder on the roll. Here is a starting point to work from, for as the barrel is drawn in, it is always in the same relative position, and consequently cannot be wrong. The operation of rolling is repeated many times by running the barrels through constantly decreasing grooves until they have attained the proper dimensions. This duty is excessively severe upon the workman. The barrel weighs ten pounds when it enters the first roll, and when it issues completed it weighs rather less than seven; the roller, therefore, handles eight and a half pounds of iron on an average all day long, as fast as he can pick it up and present it to the rolls. In the course of the day this amounts to thousands of pounds. The man at the rollers is assisted in all these labors by one helper and a fireman, and all hands have their energies tasked to the utmost. This method of producing a musket barrel is comparatively new; the old plan being to forge or weld the sheets under trip hammers. The rolling process is far superior, in

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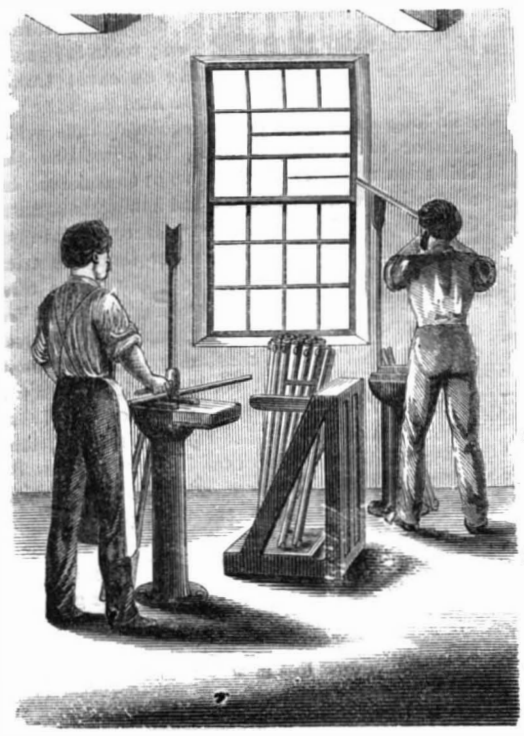
that it is unattended by noise and confusion (trip hammers make a horrible din), and results in better work in all respects. The plan is English, and was brought to this country by an individual who enjoyed a monopoly of his art for a long time, until it was at length discovered by others. Even now it takes a great while to "get the knack" of doing good work. The Providence Armory was the first to use barrel rolls in this country, outside of the Government works. When the barrels are completely finished at the rolls, they are taken to the cone-seater, who welds a rough lump of iron on one side, very much as one would stick a lump of clay the size of a hickory nut on the side of a walking stick. He then makes his mark and that of the rollers on the barrel, and it is ready for the finishing-rooms.

We have now seen the initial step toward making the musket. From this apartment we must follow our guide into another shop, where the barrels are bored out true internally; for as yet they are only rude iron tubes almost without shape or form. The barrels are laid in a lathe and "nut bored," as it is called, which consists in running a drill or cutter through from end to end. Now the barrel is very small inside--58 100ths in the bore--therefore the rod attached to the cutter would double up on the slightest pressure, and be useless if fed in the regular way. To avoid this, the cutting tool is *drawn* through, and the operation proceeds with despatch. The barrels are nut bored, and are then "quick reamed;" which reaming is merely running a fluted steel bar through from end to end. This reamer runs with great rapidity and makes a squeaking noise, which suggested that a little oil or water would not be unacceptable to it. We expressed surprise that the edge was not destroyed, but were told that no difficulty was experienced on this score: this is done several times; the barrel is bored out and ready for the straightener and turner.



The barrel is straightened after nearly every operation performed upon it, and the peculiar nature of the process excites the liveliest curiosity of the uninitiated. The observer sees a number of men behaving in the most singular manner—taking up the barrels, holding them to their eyes for a minute, and then laying them over a block, they give a slight tap on one side and the thing is done. But how, asks the reader, do the men know where to strike? For further information on this point we must refer the interrogator to the workman; all that we can say is that a piece of ground glass is fixed in a frame hung across the window; on this glass there is drawn a parallel line; this line is the only guide to correctness. The operator raises the barrel and gazes through it at the lines; these are reflected on the inside of the barrel bore, and being perfectly true, any deviation in the barrel, be it ever so little, is seen and rectified by the hammer. The engraving of the two processes, rolling and straightening, were drawn on the spot.

SHAPING THE BARREL.

The rough exterior of the tube must now be removed and rendered more sightly and also lighter by going through the finishing processes. The first step is to turn it in a lathe; this is done quite rapidly, being of a regular taper from end to end. Whoever takes a modern Springfield rifle in hand will see that there is an octagon formed at the lower end near the breech. It is done in this wise—when the tool runs up near where the octagon should commence, a certain arrangement strikes against the carriage and throws an eight sided "former" against the tool; this has a yielding motion, governed by the "former," and thrusts in and out as the angles and sides push the tool in, thus a perfect octagon is made by a revolving motion. This was thought to be impossible at one time, but the Providence mechanics seem to think with Napoleon (or Joe Miller, we forget which) that nothing is impossible to him who wills. These lathes are nearly automatic, for the speed decreases as the work gets heavier, and the tool stops altogether when the task is done; so that there is no danger of spoiling the "job." One man is able to tend six of them, and when they stop the belt shipper flies back very quickly. This feature was unlooked for by us, and as we watched the operation the shipper bar came whizzing by the editorial nose and threatened to annihilate it; to the no small delight of a grimy-looking boy in attendance.

(To be concluded next week.)

One Effect of the High Price of Sugar.

Nothing is more characteristic of our people than fertility of resource, and the readiness they display in adapting themselves to circumstances, favorable or adverse, is remarkable. This trait has recently been brought to our notice with great force, by reason of the immense numbers of *bee hives* inventors have forwarded to us, with the commendable design of stimulating, through better habitations and economical arrangements generally, the art of bee culture. In this, the shrewd observer will see a loop-hole of escape from the high prices for all sorts of "sweetening" which now prevail, and which are not so much due to the taxes imposed by Government as to the combination of unscrupulous speculators. Sorghum mills were at one time all the rage and also other apparatus for defecating, and granulating the sap of all sugar-bearing plants and trees; but we think nothing is more noteworthy in connection with this subject than the efforts of our inventors to provide comfortable and profitable bee houses, whereby the crop of honey—a delicious substitute for molasses—will be largely increased during the coming year. If it tends to lower the price of the article, now far beyond its intrinsic value, the exertions of the inventors will not have been put forth in vain.

Practice with Lyman's "Accelerator."

Some time ago Mr. A. S. Lyman, of this city, constructed a gun at the Novelty Works on a peculiar principle: one previously embodied, however, in a small arm, from which he had fired a half-inch pointed steel bolt, eight inches long, through a block of iron six inches thick. The block was on exhibition at this office for some time. The gun alluded to was fired at Washington a short time ago, with the following result. The target was a 5 inch iron plate backed with 18 inches of live oak; at 204 yards, the longest range that could be obtained, the projectile passed completely through all obstructions, including a mass of rubbish behind the target, and struck the water 100 yards in the rear. This is "good shooting." On the occasion referred to practice had been had with an English Blakeley gun, the projectiles from which stuck in but did not penetrate the iron. Admiral Milne, Lord Lyons, Secretary Seward, and others were present, unknown to the inventor. This notice is also contraband, so far as Mr. Lyman is concerned, he having a reluctance to publish facts at present.

A London professor lectured recently on adulterations of food. He handed round coffee, which was pronounced excellent, then told the audience that they had been regaled with a mixture of bullock's blood, chicory, sheep's liver, dried and old coffee grouts. He gave them capital porter too, made of spirits of wine, gum arabic and burnt sugar.

Correspondence

Abuse of Exhilarating Gas in Surgery.

Messrs. Editors:—During the past year public attention has been frequently called to the properties of the protoxide of nitrogen or "laughing gas," and many persons have been subjected to its influence, without being aware of its dangerous properties. Scientific men have been silent all this time, as its uses were chiefly confined to persons for public amusement. But it is time to interfere, when it is recommended for and used in surgical operations. The properties of this gas have been known since 1776, and those who now proclaim it to be a new anesthetic agent, capable of taking the place of ether, impose upon the public, as a work was written upon this very subject in 1847. It is known that atmospheric air supports animal life from the oxygen contained in it, and the essential functions of respiration can be carried on in an atmosphere of protoxide of nitrogen, but a prolonged use of this gas will give rise to disturbances of the system sufficient to produce death. Plants introduced into vessels filled with this gas faded in about three days, and they soon afterwards died. Its effects upon insects, annelides, mollusca, amphibiads, birds and mammals, were examined by Sir Humphrey Davy, and on all of these it acts as a positive poison. It produces peculiar changes in their blood and organs, terminating in death; and when forced into the veins of animals it disorganizes the nervous system, according to Nystem. Dr. Paveira says respecting it—"I have administered this gas to more than one hundred persons, and have observed that after the respiration of it for a few seconds, it causes frequent and deep respirations, the color of the lips and whole face become blue, temporary delirium is produced and an indisposition to part with the inhaling tube. The sensations are pleasing; the delirium manifests itself differently in different persons: I have known it to produce stupor, singing in the ears, giddiness, tingling sensations in the hands and feet, &c." Professor Silliman mentions a case in which the effects of this gas produced a complete perversion of the sense of taste for eight weeks; and A. S. Taylor states that some serious after effects upon the brain have been produced by its inhalation. I could cite the opinions and experience of many other authorities upon this subject, all coming to the same conclusion, that the effects of this gas are dangerous. It was known in 1847 that it produced insensibility to pain when used as an anesthetic agent. It appears unsafe to employ it in surgery even for such small operations on teeth. It cannot, therefore, be recommended as a substitute for ether or an anesthetic agent, although a new agent, as harmless and as effective as ether, without possessing its strong odor, is very desirable.

Prof. H. Dussauce.

New Lebanon, N. Y. Oct. 23, 1863.

The Parrott Gun.

Messrs. Editors:—In the Scientific American, of Oct. 24th, a correspondent points out what he considers the defects in the manufacture of the Parrott gun; he suggests that the muzzle and chase should be made according to Dahlgren's pattern, and but a thin skin of iron turned off, in order to preserve the strong external surface of the casting. Your correspondent does not seem to be aware that there is greator difference between the rough and finished Dahlgron gun than in any other, owing to the great thickness of metal cut away from the muzzle. The Rodman core could not be introduced with advantage, save in a gun of the present Columbiad model.

Pitt.

Pittsburgh, Pa., Oct. 19, 1863.

Specie in the United States Treasury.—Gold is accumulating fast in the Treasury, and will be kept there until specie payments are resumed, except at the recurring periods of the payment of interest on the public debts.

Those who would like early salad next spring would do well to plant a bed of lettuce this fall.

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PREVENTION OF DECAY IN WOODEN AND IRON SHIPS.

In our last issue—page 282—we presented some very useful information on the preservation of timber, and the prevention of iron from rusting, chiefly applicable to wooden and iron vessels. The following is a continuation of the same subject from the same source, being collected from patents issued in Europe.

In 1853, M. Romaine patented a process for treating wood to render it more durable and uninflammable. It was steeped in a tank containing water, and two bushels of hydraulic lime for every 500 cubic feet of wood, to render it uninflammable; and to render it more durable it was steeped in a tank containing three bushels of lime and one gallon of gas tar mixed with sufficient water to cover the wood. After steeping for a few days the timber was lifted and dried in the air. In the same year John Bethel patented the use of 1 pound sulphate of zinc to every 60 pounds of water, for charging wood to preserve it from decay; or 1 pound chloride of zinc to 60 pounds of water; or 1 pound sulphate of copper to 80 pounds of water. These quantities of metallic salts are standards for the strength of the solutions employed. T. E. Cook patented in the same year a composition of 2¼ pounds shellac, ½ pound seedlac, ½ pound gamboge, ½ pound gum arabic, ½ pound gum benzoin, and 1 pound of white lead, applied as a paint to preserve iron work, especially the hulls of iron vessels. At the same time, C. S. Jackson patented the use of two classes of salts in solution for preserving timber, consisting of the salts of zinc and the chlorides and sulphates of alumina. In 1854, three patents for such preparations were granted, namely to A. E. Le Gross, Paris, for a mixture of neutral magnesia and resinous oil in solution, for preserving timber; to H. K. Poole, for a mixture of the sulphate of copper in solution; and one to John McInnes for a preparation of yellow soap and blue vitriol, to be applied to ships' bottoms. During 1855, five patents were issued, as follows:—Leopold Oudry and Alphonse Oudry, of Paris, for covering metals and wood with copper, by electric depositions in the common manner that copper is deposited on plaster, or other molds, and also upon metals; one to M. M. Rey & Guilbert, of Marseilles, for a composition of sulphuret of copper and sulphuret of antimony, mixed with varnish and applied to iron vessels; one to Westwood & Baillie, iron shipbuilders, London, for applying first a coating of black varnish, then a coating of hot asphalte to the hulls of vessels; also one to H. Bencherie, for impregnating wood with creosote, solutions mixed with tannin, resin, and fats. In 1856, four patents were issued, one to C. S. Jackson, for a solution of the salts of zinc and iron combined, to preserve timber; one to P. M. Barlow for forcing air first through the pores of green timber to drive out the sap, then charging it with any preservative solution; another to R. M. Seiner, for saturating planks with a solution of gelatine and chloride salts, then pressing them between rollers to compress the cells of the timber; also one to C. A. Ferguson, of London, for charring the surfaces of ship timber, to prevent mildew and rot. The plan proposed to effect this object was by passing red hot iron rollers over the surfaces of the wood. Charring of the surface of ship-timber is now practised in the French navy yards. Six patents were issued in 1857. The first was to J. E. Cook, for a poisonous compound to be applied to ships, consisting of 8 ounces of dragon's blood and 1 ounce of strychnia, mixed with 4 pounds of shellac varnish. The object was to prevent the attack of marine animalculae. M. Closson obtained one for a paint made of plumbago in powder, and linseed oil applied to iron; M. Boboeuf of Paris one for the use of phenate of soda of 5° Beaume applied to wood; one to A. Prince, for the silicate of soda applied to wood, then treated with dilute muriate acid, to render the timber incombustible; one to A. Wall, fpr the applications of oxides of zinc and copper as paints for iron; and one to Green & Coppin for charging dried ship-timber with a solution of sulphur and arsenic. Two patents were granted in 1856, one to J. Scott Russell for first coating iron ships' bottoms with the size that gilders employ; then when this was dry applying a varnish mixed with copper reduced to powder. It was stated that this would answer the same purpose as copper sheathing with a non-conductor between it and the iron. The second was issued to F. Ransome, for impregnating wood first with a silicate of soda; then with a solution of the chloride of calcium for preserving and rendering it incombustible. Two patents were issued in 1859; one to H. P. Burt for creosoting timber under pressure in a tank; and the other to H. W. Hutton for subjecting timber first to the action of carbonic acid gas, then saturating it in a tank with a solution of silicate of soda; and afterwards by strong a solution of the chloride of calcium. In 1860, M. Mangles secured a patent for preserving timber by treating it with chlorine gas in a close chamber. Four patents were granted in 1861, namely, one to T. F. Williams for a mixture of gutta percha and the residue of distilled palm oil; one to C. Davis, for a mixture of soap, pitch, spirits of turpentine, and india-rubber applied to wood; another to M. Cullen for a composition of coal tar lime and charcoal applied to wood; and one to T. Cobley for impregnating timber with solutions of potash, baryta, lime, magnesia, and fluo-silicic acid. Almost all the known substances under the sun have been secured by patents as applicable to the preservation of timber and iron from decay and rust.

Photographic Printing and Engraving.

The following useful and deeply interesting extracts are from a paper by W. Crooks, F. R. S, in the *Popular Science Review* (London, England):—

"A process has been brought to considerable perfection, by Sir Henry James, in the Ordnance Office, Southampton, where it is used for producing copies of maps. A mixture of gelatine and bichromate of potash is in this case also the foundation. A surface prepared with this mixture is exposed to the action of light behind a transparent picture of the map, or other object to be copied, which is tightly pressed against it. The change which has been already described takes place, and now a roller charged with lithographic ink is passed over its surface. This blackens the whole, but when it is soaked in warm water, those portions of the sensitive surface which remain unchanged by the action of the light are dissolved out, and the lithographic ink is thereby removed from those parts of the picture. A prepared flat surface of zinc is then placed in contact with the inked picture, and the two are submitted to heavy pressure, when a complete transfer of the picture will be found on the zinc. After suitable preparation any number of copies can be printed from this zinc plate in the ordinary printing ink. This process is capable of giving very perfect results, and when applied to the reproduction of manuscripts, prints, or similar matter, it is impossible to conceive a more perfect reproduction. Indeed, it is no easy matter, when the original and the photozincographic copy are placed side by side, to distinguish one from the other; and if the copy has been reduced in size by the photographic means, most persons would prefer it to the original both in point of delicacy and sharpness.

"By the photogalvanographic process of Pretsch, a plate of glass, or any other smooth surface, is coated with bichromate of potash and gelatine, and then exposed to the light under a photograph or an engraving; it is then moistened with water, but not thoroughly washed. The first action of moisture is to cause those portions of the surface which have not been exposed to the light to swell and rise up, more or less, in ridges from the surface of the plate. A mold is then taken from the plate so raised; from that an electrotyped copper plate is procured, which is used as a matrix, from which other plates may be produced suitable for printing purposes. The gelatine, in swelling, is found to split up into ridges, giving to the whole surface a granular effect, which holds the printing ink equally well in the fine lines and the broad masses of shadow. This process gives very effective prints when they are large, and viewed from a distance; but for fine, delicate work it is not so successful.

"An art like this is still in its infancy. As soon as a method of photographic engraving comes into general use for book-illustration, improvements will follow one another rapidly. The general adoption of a process of this kind would be invaluable; an engraving of any object or scene, however good the artist might be, is not, and cannot be, an exact representation; at the best it is but a mere approximation to that, and there is always a tendency for the artist to idealise the subject and render it difficult to recognise at first glance, or he will not descend to those minutiæ of detail which give such a charm to the photograph. The great value of photography is that it produces absolute *fac-similes*; but this value is lessened by the tedious rate of reproduction, and the great probability that in twenty years' time upwards of ninety per cent. of the photographic prints now in existence will have faded out. By wedding engraving to photography, and making the same physical agencies which impress the sensitive tablet produce the engraved plate, the mathematical accuracy of form and detail possessed by the photograph is secured, united to the permanence of a printed book. For the illustration of objects of natural history, flowers, plants, and animals, even to the most minute microscopic objects this invention is invaluable. By it *fac-similies* of rare engravings or manuscripts can be multiplied to any extent."

Impressions on the Retina after Death.

A great deal of unprofitable discussion has been spent on this subject, and we think the fallacy of it well set forth in the following paragraph cut from the *Medical and Surgical Reporter*. If the story of the ox is "true," then we may look at a fish's eye and see a hook therein, or at a chicken's and discover the fatal axe that chopped off its head, and so on through an unending list of absurdities:—"An English photographer, Mr. Warner, lately took a photograph of the eye of an ox a few hours after death, and on examining the impression through the microscope, distinctly perceived on the retina the exact delineation of the stone with which the slaughter house was paved, being the last object which affected the vision of the animal on bending down its head to receive the fatal blow. The consequence deduced from this very apocryphal story is, that if the eyes of a murdered man be photographed a few hours after death, the likeness of the murderer will be found on the retina, that being the last object he could have seen during the death struggle. Without entering upon the judicial value of evidence thus obtained, we will simply state the reasons which we consider sufficient to cast a doubt upon the whole thing. If, a few hours after death, the retina retain the picture of the object from which it receives its last impression, we must suppose the retina to possess the property, not only of receiving photographs like sensitised collodion, but also of fixing them, which in photography requires a liquid different from that which renders the surface sensitive. Now, hitherto, the retina has not been found to possess any such properties, one of which, it must be kept in mind, is the direct contrary of the other. If in the living subject the retina only receives a momentary impression, how and by what physiological process can it, in the dead subject, retain an impression for several hours after death? In the present state of our knowledge there is nothing to warrant such a supposition."

Grist Mills.

In a recent work on "Mills and Millwork, by William Fairbairn, F. R. S.," a description is given of a mill erected by him for the Russian Government at Taganrog. There are 36 pairs of 4 feet stones in it; these are driven at the rate of 140 revolutions per minute, and each pair grinds from 5 to 5½ bushels per hour. With respect to shafting, a peculiar case is related:—In a range of shafting of 220 feet, the diameter being 3 inches at one end and 2 inches at the other, the work was done uniform throughout; but it was soon found that the shaft made considerably more than one complete revolution at the driven end before it began to move at the other. This caused a constant succession of jerks, or accelerated and retarded motions, injurious to the machinery and destructive to the work it had to perform. At the middle of the length of the line of shafting the resulting twist was very severe, and the line had to be supplied with a stronger and heavier shaft. With respect to gearing and belts in driving machinery, Mr. Fairbairn gives the preference to gear wheels. He asserts that belts strain the journals, that they are liable to slip, and are very objectionable in the manufacture of fine cotton. Belts are more noiseless, and their first cost with pulleys less, but accurately cast gearing is more enduring.

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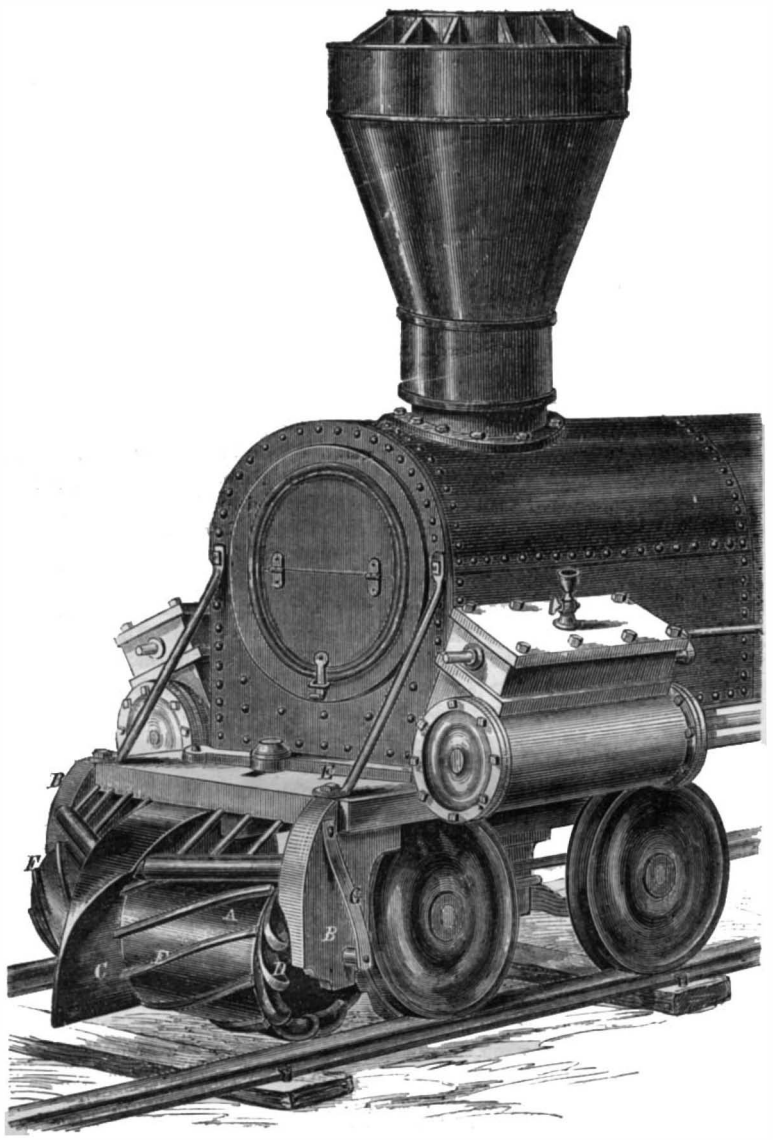
Improved Railway Pilot.

Many lives are annually lost and much property destroyed by railway accidents, and of these not a few are directly the result of obstructions on the track. The remedy for trouble of this sort has always been found in the old-fashioned pilot, or, as it is popularly called, the "cow-catcher." This has been found a very useful appliance, but anything less than a cow, or, more properly speaking, comparatively small obstructions, such as stones, trees, sleepers, &c., run under the cow-catcher and virtually destroy all the protection it ought to afford.

In the accompanying engraving we have illustrated a new pilot, which is intended to overcome these troubles. It consists of two revolving cylinders, A, of a conical shape, running on bearings in the frames, B and C; these cones have peculiarly-shaped teeth, D, which engage with corresponding teeth on the inner side of the forward truck wheel. By these teeth the cylinders are rotated; when thrown out of gear by the lever, E, they do not revolve but remain idle at the pleasure of the engineer. The cylinders are also furnished with wings, F, which traverse their circumference at regular distances; these wings act on any obstruction lying between the track, and from the nature of their position and form, throw said obstacle upward and outward entirely clear of the rails.

A peculiar and ingenious feature of this invention is the shape of the teeth which drive the cylinders. It will be seen that they are not cogs, but that they consist of a series of gradually inclined curves, and that they can be thrown into connection with the truck wheels at any time, even when running at the highest speed, without danger of breakage. A small spring, G, is fitted to the ends of the cylinder shaft, so as to keep the cylinders in position and avoid end play. The apertures between the top of the pilot and the foot board are closed by the ordinary arrangement of bars. This pilot can be attached to any engine, involving no other alteration than placing the rack on the inside of the forward wheels. This duty involves merely the drilling and tapping of a few small holes, easily done in a few minutes by any mechanic; when put on to special order, the rack may be cast with the wheel.



E. & A. WYCKOFF'S RAILWAY PILOT.

The invention was patented on May 3, 1863, by E, & A. Wyckoff, of Elmira, N. Y. For further information address them at that place.

DEATH OF LORD LYNDHURST.

Recent English papers announce the death of this venerable statesman, at the advanced age of ninety-two years. In many respects he was a remarkable man, and being an American by birth, he is also a subject of somewhat greater interest to us on this account. His father—John S. Copley—was a painter of some distinction in his day, and resided for some years in Massachusetts, where the future peer was born, May 21, 1772, and which he left at three years of age with his mother and the entire family. In early youth he exhibited superior abilities, and his parents were enabled to give him a collegiate education at Cambridge, where he graduated with high distinction, having the object in view of following the profession of law. Previous, however, to being called to the bar in 1804, he visited his native country, and was introduced to Washington.

Soon after his entrance into public life, his powers of logic and oratory attracted the attention of leading English politicians, and he entered political life under the patronage of the tory party then in power. His promotion was rapid. He was made Sergeant-at-Law in 1813, became Chief Justice of Chester in 1818; was Solicitor-General from 1819 to 1823; Attorney-General, 1823 to 1826; and Master of the Rolls from 1826 to 1827. On the retirement of Lord Eldon in 1827 he was constituted Lord Chancellor of the Empire, when he attained his peerage by patent (under the title of Baron Lyndhurst) dated April 27, 1827. He resigned the chancellorship in 1830 to resume it in December, 1834, for a short period. For the third time he was appointed to this post in September, 1841, from which he finally retired in July 1846. He has since, until very lately, been a constant attendant in the House of Lords.

Lord Lyndhurst was accounted one of the most eloquent men in the British Parliament. When he spoke he always drew a crowd. In his prime he was considered one of the handsomest men in either house, and to the last he had a fine presence. His voice was clear and musical, and his style of speaking interesting. He was a master of wit and sarcasm, but he knew especially well how to state a case in such a way as to convince almost all who heard him. During the latter years of his political career he witnessed a happy change in the conduct of political parties. The virulence and animosity which characterized the old Whigs and Tories had departed and given place to kindliness and almost uniformity of sentiment in both Houses of Parliament.

COAL AND STEAM POWER.—In a paper read before the British Association on the Coal and Coke Trade of the North of England, Mr. Nicholas Wood said it had been calculated that an acre of coal four feet in thickness produced as much carbon as 115 acres of full-grown forest, and that a bushel (84 lbs.) of coal consumed carefully, was capable of raising 70,000,000 lbs. one foot high, and that the combustion of 21 lbs. of coal gave out power sufficient to raise a man to the summit of Mont Blanc. The aggregate steam power of Great Britain he sets down at 83,635,214 horse-power, or equal to 400,000,000 of men.

A Huge "Pouring"—Seventy Tuns of Iron Run at One Heat.

We are indebted to the *Pittsburgh Dispatch* for the following account of an experiment to determine the feasibility of running the quantity of metal required for a twenty-inch gun, which weapon, it seems, is actually under way:—

"We have already noticed the fact that preparations were progressing at the Fort Pitt Works, in this city, for the manufacture of twenty-inch guns, the lathe, patterns, &c., being in an advanced condition. As the experiment of manufacturing a gun of such a caliber, however, is one of great risk, it was determined to settle at least one point practically before attempting to mold the great gun, by melting, at a single heat, nearly the same quantity of metal as would be required for the twenty-inch. For this purpose two guns were molded of the fifteen-inch navy pattern, and each furnished with a twelve-inch instead of a fifteen-inch, hollow core, making the rough weight of each of the guns nearly as great as that of the columbiad fifteen-inch. These molds were placed side by side in the pits of the new foundery, and on Saturday morning five of the furnaces in the foundery were charged, three for the special purpose of casting the great guns, and two for the ordinary work of the shop. The respective weights of these charges will give some idea of the capacity of these enormous furnaces, being thirty-four, nineteen, nineteen, thirteen, and eighteen and a half tuns—an aggregate of nearly *ninety four* tuns, with a far greater amount of metal, we believe, than was ever reduced in furnaces in a single establishment in one day. Seventy-two tuns of this metal, being the charge of the three large furnaces, were designed for the casting of the experimental guns. The metal was led from each of these furnaces to a large pool, equidistant from each of the molds, and communicating by two "runners" with the two "gates" of each.

"About one o'clock the three furnaces were tapped in quick succession, and in a moment three streams of molten iron were pouring into the pool, from which, as the metal rose to the level of the openings, two fiery lines shot into each of the molds. The intense heat of the iron pouring along these seven streams, with the molten mass in the reservoir, seemed to have no extraordinary effect on the workmen, who performed their accustomed duties of skimming and clearing the molds with as much indifference as if the glowing metal surrounding them and filling the air with showers of sparks were harmless streams of water. Familiarity with such situations is apt to breed contempt of danger, but we believe that no accident has ever yet occurred at the works during the operation of casting. Notwithstanding the unusually risky character of the experiment on Saturday, everything passed off successfully, and the streams of hot metal and cold water, crossing and interlacing on their way, poured into the molds without accident."

GREAT DEMAND FOR IRON.—The furnace of Chapinville (Litchfield) is turning out six tuns of iron a day. The *Enquirer* says:—"Seeing a teamster waiting by the furnace for the iron to cool that he might get a load, we said to the weigher, 'Is iron in such demand that you are obliged to send it off hot?' 'Yes,' said he, 'and sometimes we run it directly into the carts instead of the sand-beds.'"

THE total enrolled strength of the British volunteer force is 1,300 cavalry, 23,000 artillery, 2,500 engineers, and 132,000 riflemen—total 159,000.

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ENERGY AND APTITUDE OF AMERICAN MECHANICS.

In the course of some apposite remarks upon schools for the dissemination of correct mechanical knowledge, and the inculcation of the truths of science among the practical workers in machinery in general, the London *Engineer*, England, pays a deserved compliment to American mechanics and says that "many articles of machinery could now be imported here, were there a market for them, and sold under London prices. We know of many instances in which this could be done, and yet iron, and workmen's wages are one-half dearer on the other side of the Atlantic than here. The workmen are better educated, more ingenious, and somehow, although they do not work physically harder, turn out more work than our own mechanics. The cheapness of their work can only be accounted for on the principle of microscopic profits. Many of the marine engine factories, most of the locomotive works, and nearly every railway carriage factory in the States has been, at some time or other, bankrupt; a commentary upon the spread of engineering information."

The statements are all correct in the above-quoted paragraph, but the conclusions and inferences of the *Engineer* are erroneous. Tools are made cheaper here and equal in quality to those abroad, because we have special machines for special work, and for the reason that the same tool is adapted to do many different kinds of work. In the locomotive shops of the East, this principle is of necessity carried to an extreme point. Some of the shops have failed, it is true, because of the competition of the roads to which they furnished engines, on which they relied for payment and were disappointed. Workmen cannot be paid with bonds and coupons, and when a new engine is delivered once a week or month, as the case may be, we fancy it would endanger the stability of any shop to be paid in bonds, worth, perhaps, 50 cents in the dollar. Greater quantities of work are produced by the exercise of that keen ingenuity for which "Yankees" are famous, as in fitting up brass boxes in the lathe instead of filling, as is usually done, and otherwise adapting means to ends. In many shops East one man will run two lathes, or two planers; and objectionable as this is in general, it is perhaps not so much so where the workman *contracts* to do it and receives wages accordingly. So also with apprentices; they are so only nominally, for in a short time they acquire as much dexterity as a journeyman; and, stimulated by an ambition to be considered "smart fellows," do as much work as one paid at twice the wages they receive. Thus a journeyman may receive $2 per day, while an apprentice obtains in his last year of servitude $1, and is equal to a full hand. This being the average rate of pay down to $1 50 *per capita*, and even still lower; for all journeymen do not receive $2 per day by any means. The present time is an exception to this rule, as the demand for good workmen is greater than the supply. For patient and steady persistence on one kind of work, and for thorough and faithful execution, there is no artisan better than an English one; but the American workman "gets sick," as he phrases it, of sameness and monotony, and demands change; he is restless and uneasy under restraint and delay, and the work in our machine shops never goes on so well as when every man is put on separate and continually varied jobs, as far as possible, and feels that his handiwork will be contrasted with that of his fellows. This characteristic is only true of intelligent and conscientious men: for there are skulkers and drones to be found in all shops and in all countries. The system of discipline by which American machine shops in general are carried on is an extremely good one, for it conduces directly to the interest of all parties—the young apprentice and the employer. Time is money; and if by personal attention and a free access to all details of the trade, and an opportunity to acquire a thorough insight into the management of tools, our apprentices learn more quickly, it must be laid to the plan and not wholly to individual or national superiority. It seems not a little singular that a manufacturer should debar a youth from the privilege of learning as much and as fast as he desires. Such a course is directly opposed to reason and common sense.

THE CROPS OF THE YEAR.

The first momentous question for a nation to consider is securing an abundance of food. Nations and tribes once numerous and powerful have perished from the face of the earth by famines. From the first appearance of the potato rot in Ireland, nearly twenty years ago, the population of that island has diminished from above eight to a little over five millions. Thousands perished from famine, because of the failure of a root which formed a chief portion of their food. This took place in our own day, and is a sequel to many cases of a similar nature which occurred in other portions of the globe. All the arts connected with civilization are dependent, not only upon an abundant supply of food, but a surplus supply from those who pursue the art of husbandry. If every man was compelled to till the soil to obtain a scanty supply of food for himself and family, civilization, as we understand the subject, would be unknown. There would be no books, no institutions of learning, and none of the fine arts practiced; in fact, no cities, and no community in the whole earth of a higher type than the Bedouins of the desert. The very rapid advancement in population, in wealth and power of the United States, has been due in a great measure to the fertility of the soil and the favorable nature of our climate. Since the great West was opened up to culture by an energetic people, the vast surplus crops of the soil have tended to multiply manufactures, and advance education and all the arts with a rapidity unparalleled in history. The nature and quantity of the crops raised annually should, therefore, form the most prominent consideration for the people. For several years these have been wonderfully abundant, and large surplus supplies have been furnished for the populations of Europe, especially those of Great Britain, when the crops there had in a great measure failed for about three years in succession. As these surplus supplies of food chiefly furnish the sinews for war, as well as the arts of peace, considerable anxiety was felt respecting their condition and quantity the present year. This anxiety was experienced because a severe frost had visited extensive sections of Ohio, Michigan, Illinois, Indiana and Wisconsin, during the month of September last, and it was reported that corn, potatoes and buckwheat had suffered to an alarming extent. Statistics collected and furnished by the Agricultural Department at Washington afford information on this subject of an instructive and deeply interesting nature. The total wheat product of the loyal States for 1863 is estimated at 191,068,239 bushels; oats, 174,858,167; corn, 449,163,894; buckwheat, 17,193,238; potatoes, 97,870,035. In 1862, the product was as follows:—Wheat, 189,993,500 bushels; rye, 21,254; barley, 17,981,464; oats, 172,520,997; corn, 586,704,474; buckwheat, 18,722,995; potatoes, 113,533,118 bushels. There has, therefore, been an increase of the wheat crop amounting to 1,074,739 bushels; of oats, amounting to 2,327,170 bushels, but a very large decrease in all the other crops, especially corn and potatoes—in the former amounting to no less than 137,540,580 bushels. About 40,000,000 of wheat and 11,680,000 bushels of corn were exported of the crop of 1862; but the crops in Europe this year have been very abundant, and the foreign demand for our surplus will thereby be diminished in proportion. The domestic consumption of corn is set down at 575,024,132 bushels annually, and at this rate there will be a deficiency this year of 125,869,000 bushels, and the hay crop is deficient about 1,624,000 tuns. This quantity of corn allowed for home consumption is large and in a certain sense hypothetical. Many millions of bushels of the crop of 1862 are still in storehouses, and millions have been wasted annually in the fields. Economy, with respect to corn or wheat, is an obsolete word in the great West, as is well known to all who have visited there. The total supply of grain and potatoes this year, with all the deficiency, amounts nearly to a thousand millions of bushels, or about forty-five bushels to each person, and is sufficiently abundant for domestic consumption, with an overplus to satisfy a considerable foreign demand.

ARMSTRONG GUNS RIDICULED.

We recently gave (page 233, current volume, SCIENTIFIC AMERICAN) an account of the vast sums—amounting to more than ten millions of dollars—which the British Government had expended on Armstrong guns, and that they had at last been condemned. On this subject the *Examiner* (London) indulges in the following amusing piece of criticism:—

"It is a perfect anomaly to send our armor-clad fleet to sail round our islands and visit our ports without an effective gun on board any one of them which could make a hole in the side of its neighbor. We are thereby reminded of the brave knights of old, who were so encased in steel as to fight half a day without hurting anybody, unless some of them fell down, and, not being able to flounder on their legs, were smothered in their armor." And one of its correspondents growls that "two years have given the Americans forty or more 200-pounders, which have beaten down a strong fortress at a distance of two miles. Sir William Armstrong's 210-pounder, at that distance, could hardly knock an old duck off its nest; and no gun that was ever cast or forged, with a charge of twelve pounds of powder, could do that which Parrott s guns have done."

The London *Telegraph* indulges in the following bitter sarcasm on the same subject:—"Instead of calling all scientific England to put their heads together and watch events with the Ordnance Office, Sir William Armstrong was shoved up the ladder alone; his own committee approved his own guns; his own factory at Elswick turned them out, on his own evidence, without sufficient proof and trial; and 'the first hundred of the 110 pounders were served out before the experiments upon them had been concluded.' In a country full of founderies and inventors, Elswick alone drew £1,067,794 between 1859 and 1863, and Woolwich, under the orders of the 'retired partner,' spent another £1,471,753."

If all these statements are reliable respecting the Armstrong guns, the Government officials—such as General Peel, Secretary of War, and others who patronized them, deserve condemnation for stupidity and cupidity. A few years ago this gun was proclaimed to be the wonder of the world, and those very papers which now pelt it with their sarcasm, were as loud in its praise as they are now voluble in its censure. And who was like its great fabricator? He was held up to be the right arm of Britain's defense, and was dubbed with knighthood for his great achievement in the production of such incomparable war dogs. And now, after expending over two million pounds sterling, and arming the navy with them, they are found to be incapable of "knocking an old duck off its nest."

THE GREAT ORGAN.

A very full and interesting account is given in the *Atlantic Monthly*, of the great organ which will soon be completed in the Boston Music Hall. It is stated that this great organ is "a choir of nearly six thousand vocal throats." Its largest wind pipes are thirty-two feet in length, and they are so wide that a man can crawl through them; while at the same time the finest tubes are as small as a baby's whistle. It contains several distinct systems of pipes, capable of being played alone or in connection with one another, by four manuals or key-boards. These systems are called the solo organ, the choir organ, the swell organ, the great organ, and the

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piano and forte pedal organ. It is stated that in absolute power and compass this instrument ranks among the four greatest of the kind ever built, and in the perfection of its parts and its whole arrangement it challenges comparison with any other in the world. The wood of which it is constructed is beautiful black walnut covered with carved figures in relief. A richly ornamented central arch contains the key-boards and stops, the pediment above is surmounted by a bust of Johann Sebastian Bach. Behind this rises the lofty central division containing pipes; and crowning it is a beautiful statue of St. Cecilia holding her lyre. On each side of her is a griffin sitting as a guardian. The center is connected by harp shaped compartments filled with pipes to the two grand towers at the sides, each containing three colossal pipes. These towers are stately, and produce a commanding effect. This organ is placed upon a low platform; its whole hight is sixty feet, its breadth forty feet, and depth twenty-four. It is a majestic, beautiful, and wonderful piece of art, and before it stands Crawford's noble bronze statue of Beethoven. The Boston Music Hall is of ample dimensions to give play to the waves of harmony that will proceed from this majestic instrument. It is one hundred and thirty feet in length, seventy-eight in breadth, and sixty-five in hight. Its dimensions are all multiples of the number thirteen, the length being ten, the breadth six, and the hight five times this number. This is in accordance with Scott Russell's recommendation, and has been explained by the fact that vibrating solids divide into harmonic lengths separated by nodal points of rests, and these last are equally distributed at aliquot parts of its whole length. This hall is therefore a great sounding board constructed according to the principles of acoustics. Boston is indebted to the President—Dr. J. Baxter Upham—of the Music Hall Association, for this great instrument. It was built at Ludwigsburg, Germany, by Mr. Walcker; the architectural frame with its elegant carvings was completed in New York, by Mr. Herter; the most important figures being executed at Stuttgart, Germany. This instrument will be one of the great attractions of the city of Boston, creditable to the musical taste and cultivated feelings of her citizens.

NEW BOOKS AND PUBLICATIONS.

Appleton's United States Postal Guide. Published Quarterly by authority of the Postmaster General.

All persons engaged in extensive business transactions must have felt the inconvenience entailed upon them by careless correspondents, who date their letters sometimes with the name of the town and no county, or else omit both, expecting that all the world must know just where their important communications originate from. When funds accompany such documents it is particularly embarrassing, as no disposition can be made of them until the correspondent writes again, and more carefully. This evil is remedied by the little volume which we have made the subject of this notice. It contains a full and complete record of all post towns and stations in this country; said list being revised frequently, so that it shall be found correct. In addition to the above, there are full directions for mailing foreign letters, postage on them, time of arrival of the mails at different towns and cities in the Union, time occupied in the transmission of letters from different points to New York city, date of sailing of foreign steamers and other information of a miscellaneous character, highly interesting and important not only to business men, but to every one who writes fifty letters a year. The "Guide" is afforded at a low price (25 cents), and will be a valuable auxiliary in the transaction of business.

Catechism of the Steam Engine, by John Bourne. D. Appleton, 443 Broadway, New York.

The familiar title of this work will strike many persons, and they will be apt to turn away from this notice under the impression that it is nothing new. Hasty judgement is always censurable, but specially in works of this character, and the engineering student, the mechanic, or even the superintendent, will each and all find information in this new edition of the Catechism, which will be unvaluable to them. The general scope and character of the original book is well known, and in this—the fourth edition—Mr. Bourne says that he has not only corrected the few errors which the first work contained, but added new and interesting matter to bring the information up to the advance made in engineering science. This is a very *great* improvement, as the chief fault with the first Catechism was its conventionalism, or adherence to old-fashioned plans of construction. English and American engineering practice is widely different both in detail, management, and construction, and to render the work popular in this respect the American edition has been altered in some parts to suit our own practice. The table of contents embraces a wide range of information; among the different subjects are to be found heat, combustion, and steam, expansion of steam and action of the valves. Modes of estimating the power and performance of boilers; proportions of the same; also of engines. Manufacture and management of engines, &c. The book is well printed, and handsomely bound, and the illustrations of American steam fire, stationary and other engines, confer additional value upon it as a work for reference and study. No mechanic, or indeed any person, whether engaged in manufacture or not, should fail to procure a copy.

The Rejected Wife; By Mrs. Ann S. Stephens. Published by T. B. Peterson, Philadelphia; for sale by H. Dexter, Hamilton & Co., 113 Nassau street, New York.

Although works of fiction are in many cases injurious in their tendency, we do not condemn all of this class as pernicious, in a moral sense, or a waste of time to read and of money to buy. In the "Rejected Wife" there are a great many clever bits of description, extremely felicitous. Mrs. Stephens is always happy in delineations of this character. The mechanical execution is highly praiseworthy, the publisher having put the matter into large clear type, as easy to read as a merchants sign.

Combe's Moral Philosophy. Fowler & Wells, 308 Broadway, New York.

We have received a work under this title, which considers the duty of man in his moral, individual, and social capacities. We have not read the work attentively, but it doubtless affords instruction and edification to the careful reader. The small type and solid matter in the pages is rather forbidding than inviting to closer acquaintance, otherwise the book is well printed and neatly bound.

Preservation of Fruit by Cold.

On two previous occasions recently, we have described modes of preserving fruits by boiling them and then closing them air-tight in suitable vessels. Our attention has just been directed to another mode of preserving fruit upon a different principle, which is thus described in the Philadelphia *Ledger* of the 17th inst. :—

"A new way of preserving fruit has begun to be practised in Greensburg, Ind., which will probably do much to render the best fruits attainable at all seasons of the year in our large cities; and this at but a trifling increase of expense for storage above the usual cost for them while in season. They can be preserved in this method from one season to another without the expense of sugar, or boiling, or cans; and preserved more perfectly in their natural state and flavor. The process, as detailed at length by the *Agriculturalist*, is in substance as follows:—

"The new plan proposed, and tried apparently with success, is to reduce the temperature below 40°, without, however, allowing it to reach 32°, the freezing point; while within those 8° fermentation cannot go on. This done, with proper care as to one or two points, the fruit sustains no injury. . . . The first and chief thing is to get a room or storehouse constructed in such a manner that one can have complete command over the temperature, so far that it shall never rise above 40° or sink below 32° from one year's end to another. To those who are accustomed to build ice-houses this will present no formidable difficulty. By surrounding almost any apartment with charcoal and saw-dust, or any other non-conducting substance, and with the aid of ice on the one hand and a little furnace heat on the other, the conditions of non-fermentation are easily thus secured. Excessive moisture of the atmosphere is averted by the use of chloride of calcium. This, and some attention to the action of light, seems to be all that is necessary to preserve even the most delicate fruits in their natural state. Apples and grapes keep perfectly and with the greatest ease. With care, strawberries, and all of those fruits most difficult to preserve in their full flavor, can, it is believed, be regularly kept from season to season."

The advantages of this system of preserving fruit are pointed out at still greater length, and it is intimated, that wherever fruits and vegetables are kept in large quantities in stores arrangements should be adopted to carry out this system. It affords us pleasure thus to hear of the application of this mode of preserving fruits on a large scale by dealers in such articles. This system was illustrated and described on page 356, Vol. X. (old series) of the Scientific American, and was patented by W. D. Parker, of this city, who gave a very extended account of the best mode of gathering fruit and preserving it on pages 43 and 50, Vol. XI. (old series) of the Scientific American. By consulting these volumes our readers will obtain full and accurate information respecting the mode of constructing such rooms for preserving fruit.

Immense Trade in Small Hardware.

There are an infinite number of household articles in use at the present time made entirely from cast-iron, and the saving in time and labor resulting from their introduction is very great. Not only this, but the taste of the people is improved, and a love for the beautiful in art fostered, by the use of graceful, and even elegant, forms in the most simple and humble utensils employed in domestic life; as, for instance, stands for sad-irons, fender-guards, foot-scrapers, clothes-racks and other things which belong to the furniture and garinture of our dwellings. In the ancient days, when the axe was the only tool at hand, our forefathers were pardonable for the clumsy furniture which cumbered their houses; but at the present time there is no excuse for badly-designed or poorly-made iron furniture, when so many skillful mechanics and enterprising manufacturers are busy in designing new and beautiful patterns, and affording the same at low prices. The statistics of the whole number of tuns of iron annually made up into iron furniture in this country would be something enormous, if procurable; but as there are a large number of factories in different parts of the country at work on this kind of merchandise, it would be a difficult matter to obtain the exact figures. The New England Butt and Hinge Company, in Providence, R. I., use upwards of one thousand tuns of iron per annum, and about six hundred tuns of coal in making hinges, sad-irons, iron-scrapers, &c., and they employ a large number of mechanics the year round in the production of these small, but very necessary articles.

The cast-iron hinge commonly used on doors involves much more labor before it is completed than an uninitiated observer would think necessary. Some three weeks elapse before the hinges arrive in the packing room from the foundery, having been all that time in the various stages of manufacture; no foreign hinges have been imported for many years. In the item of sad-irons alone about two hundred tuns of iron are consumed; or counting each iron at 7 pounds, the usual size, nearly 60,000 smoothing irons are yearly turned out at this establishment—enough, one would think, to polish all the shirts and collars in christendom. The braiding machines at these works are used in hoop-skirt manufactories, and also for general braiding purposes; as for making veins, &c., and they are so constructed that the breakage of the thread, in the larger sizes, causes the stoppage of the machine before it can go more than three inches. The English sixteen-carrier braider costs $50, but the American one is furnished at $12. In the former there is a great deal of wrought-iron, while in the latter there is more cast-iron, which accounts, in part, for the vast difference in the prices; the American tool, however, is fully equal to the English one in point of durability and efficiency. Some idea may thus be formed from this short article of the immense trade carried on in small wares of the kind alluded to; where they all go is a mystery to us. 18,000 butts per day is a goodly number, and would hang a good many doors, and 50,000 sad-irons in the course of a year would

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seem to keep the country supplied for awhile; but year after year the manufactories continue in active operation; the supply, like the demand, being seemingly inexhaustible.

"TRIAL OF KETCHUM'S HAND GRENADES."

NAVY ORDNANCE YARD,
Washington City, Oct. 6, 1863.

COMMANDER H. A. WISE, *Chief of Bureau of Ordnance.*

SIR:—In obedience to Bureau Order, I have examined and tried Ketchum's Hand Grenades, and have to report as follows:—

This Grenade is a hollow projectile ellipsoidal in shape, with an opening at each end of the longer axis. At one end is a hollow cylinder, at the lower end of which is a nipple for a percussion cap, which communicates with the charge:—This cap is exploded by the plunger which fits the cylinder. On the other end of the plunger is a concave iron disc:—a steel spring is also attached to the plunger to prevent its resting upon the cap; a short stick with paper fans attached is inserted in one end of the Grenade to ensure the disc end striking first and thereby exploding the projectile.

The projectiles, 1, 3, and 5-pounders, held 1, 3, and 5 ounces of musket powder respectively.

The trial began on a level piece of ground at Pencote Battery, and each grenade was thrown by the agent, who, however, declined to fire the 3 and 5-pounders without shelter.

Two of the 4-pounders were thrown by the agent (he being the only person exposed) 44 yards,—both of which exploded. A fragment of the second grenade fell 25 yards behind him at an angle of 10° with the line of flight.

Three ineffectual attempts were made to explode some of them in a barrel; the agent being near the point of explosion, but covered by a tree. At the fourth attempt a 5-pounder exploded in a strong iron hooped barrel, bursting the hoops and tearing the barrel to pieces; some of the fragments of the projectiles going through the staves: A 5-pounder was then exploded in another barrel not so strongly made with corresponding results.

Two of the 1-pounders were then thrown by the agent from the wooden wharf into the water, both of which exploded.

These Grenades appear to be as safe as projectiles of so dangerous a character can be devised.

Respectfully submitted,

(Signed) W. MITCHELL,
Lieutenant Commander and Executive Officer.

The frigate "Niagara."

The Boston *Commercial Bulletin* says of the *Niagara*: "This splendid vessel is now at anchor in the stream and looks well; but she is altogether too deep, as she draws nearly 26 feet of water,—two feet more than the *Great Eastern* and one foot more than the famous British iron-clad *Warrior*. Her main deck ports do not seem to be more than five feet from the water, and consequently, in a seaway, could not be opened with safety to use her best battery. We have heard that she has not room enough to contain more than two and a half months' stores for her crew, in consequence of the blunders of those sages in Washington, who designed the alterations in her. She was so deep when she had all the stores on board that some of her coal had to be taken out to lighten her. We have heard that she is bound to the Mediterranean, where she will be of as much use as if she was lying where she is—perhaps less, for here she might be used to protect the city. In the Mediterranean we require swift sloops of war and a gunboat or two, not a ship like the *Niagara*."

GUNS FOR MASSACHUSETTS.—The Putnam machine company, of Fitchburg town, have contracted for the manufacture of the heavy guns for the coast defense of this State; and are erecting buildings and machinery. A portion of the guns will be of the Blakely pattern, weighing from twenty to thirty tuns each, and all of them will be rifled, and are designed to throw a projectile weighing from three to six hundred pounds. This company will also manufacture for the State a new pattern cast-steel rifle gun, designed by C. Burleigh, one of the Putnam machine company.

RECENT AMERICAN PATENTS.

The following are some of the most important improvements for which Letters Patent were issued from the United States Patent Office last week. The claims may be found in the official list:—

Shoe pegging Machine.—This invention relates to a new and improved machine for pegging boots and shoes by hand. The invention consists in the employment of an awl, peg-driver and cutter, attached to a spindle provided with a spring and fitted within a tube, and all arranged in connection with a feed mechanism, in such a manner that, by a simple blow on the spindle, a hole will be made in the sole of the boot or shoe to receive a peg, while a peg will be driven in a hole made at the previous descent of the spindle, and a peg cut from the peg-wood to be driven at the succeeding descent of the spindle, the device being fed along on the sole for the succeeding operation as the spindle is forced upward by the spring. William Miller, of No. 3 Harrison avenue, Boston, Mass., is the inventor of this machine.

Restoring Bone-black.—This invention relates to certain improvements in the internal arrangement of the furnace, whereby the heat is equally distributed all round the retorts and throughout their entire length, and consequently an ever and uniform heating of the bone-black or other substance contained in the retorts is insured. The invention also relates to a peculiar-shaped retort; whereby a large quantity of bone-black or other material can be exposed simultaneously to the heat of the fire, in a stratum of uniform and small thickness, and the whole mass can be heated evenly and uniformly with a comparatively small quantity of fuel. Gottfried Thüilmaier, of No. 165 West 24th street, New York city, is the inventor of this improvement.

Sawing Machine.—The object of this invention is to arrange the feed rollers of a sawing machine, so that they can be readily adjusted to cut a log or timber in two or more equal parts, and that the feed rollers will adjust themselves to the thickness of the log or timber. The invention consists in combining with the feed rollers two reciprocating slides which are operated by double crank shafts, connected by a rod in such a manner that the feed rollers will arrange themselves automatically at such a distance from the plane of the saw as may be desired, either both at equal distances or one at a proportionally larger or smaller distance from said plane. S. W. Northrop is the inventor of this improvement, and Winne & Northrop, of Albany, N. Y., may be addressed in relation to it.

Skirt Wire.—This invention consists in the covering of skirt wire by weaving instead of by plaiting or braiding, as his heretofore been the common practice, thereby effecting great economy in the covering process by a great saving in the quantity of yarn required to produce a good covering, and in the power required to drive the necessary machinery, and making as good if not a superior article. William Darker, Jr,, of Philadelphia, is the inventor of this improvement, and further information may be obtained of the assignee, J. B. Thompson, No, 29 North 20th street, Philadelphia, Pa.

Stretching Hat Bodies.—This invention relates to a new and useful machine for stretching hat bodies preparatory to blocking them, such hat bodies as are fulled or felted after being formed on machines contrived for the purpose. These hat bodies, after being fulled or felted, are very much contracted in dimensions, and require to be stretched previously to being blocked and brought to the desired form; this stretching operation has hitherto been performed by hand at a considerable expense; and this invention is designed to supersede the manual operation. To this end it consists of two blocks attached to arms, the upper ends of which are suspended on a pivot and operated by means of a cam and spring, or their equivalents, in such a manner that the two blocks will be moved simultaneously toward and from each other, and the hat bodies, which are placed on the blocks, properly stretched. T. G. Oakley and W. R. Finch, of Brooklyn, N. Y., are the inventors of this improvement.

Fire Extinguisher.—The liability to fire in bins for cotton and other fibrous materials has been so great that, in all modern bins, it is customary to place a train of perforated water pipes, and connect such pipes by a cock or valve with a tank of water, so that in case of fire, water may be let into the bin by opening the cock or valve by hand; but there is often so much loss of time before opening the valve that the fire makes considerable headway before the water reaches it. The object of this invention is to make such cock or valve self-acting, and to this end it consists in the attachment to such cock or valve, of a weight which, until fire occurs in the bin, is supported in a cup or seat, in which is placed a small quantity of gunpowder, gun-cotton, or other explosive material, from which a fuze leads in serpentine or other form through various parts of the bin. When fire takes place in the bin, it must soon reach this fuze, by which it is almost instantaneously transmitted to the gunpowder or other explosive material in the cup or seat, by the consequent explosion of which the weight is blown out and caused to open the cock or valve and admit the water into the bin. William Kitson, of Lowell, Mass., is the inventor of this improvement.

Paddle Wheel.—This invention consists in constructing the floats of the wheel of two parts, to wit, one part consisting of a flat board having its lower edge rounded, and the other part consisting of a series of blocks attached parallel to the first-mentioned part and at right-angles therewith; the blocks being wedge-shape in their transverse section, and rounded at their outer and inner ends, whereby the floats or blades are made to operate without the concussions and jars which attend the operation of the ordinary paddle wheels, and the "lift," as it is commonly termed, produced by the resistance the water offers to the buckets as the latter leave it, avoided, and, at the same time a strong, durable and economical paddle wheel obtained. Leonard Ames, of Wanbeck, Wis., and Melville Miles, of Pepin, Minn., are the inventors of this improvement.

Breast Pump.—This invention relates to certain improvements in that class of breast pumps in which the rarification of the air is effected by the action of a flexible elastic globe or diaphragm. The invention consists in the employment of an elastic hemisphere placed on a flanged disk which is provided with a valve and secured to the top of the breast cup in such a manner that said hemisphere can be readily placed on the flanged disk without requiring any fastening, and the air in the cup can be rarified by repeated action of the thumb or one of the fingers on the hemispherical diaphragm. The invention consists also in the application of a small strip of oil silk or other suitable flexible material tied across the aperture leading to the interior of the cup, in such a manner that on depressing the hemispheres, said strip is pressed down upon the aperture and caused to close the same, and on releasing the hemisphere the strip is drawn off from the aperture and the air in the cup is rarified. It consists, finally, in the arrangement of a recess in the middle of the flanged disk which supports the hemispere, to receive the valve and a small quantity of loose cotton or other suitable material saturated with oil, in such a manner that the valve is protected against injury whenever the hemisphere is removed, and that by the action of the grease the valve is prevented from sticking. John N. Beadle, of New York city, is the inventor of this improvement.

Slide for Extension Tables.—The object of this invention is to construct the slides for extension tables, in such a manner as to obviate all difficulties attending the swelling of the wood and the consequent sticking or bending of the slides, which causes a great deal of embarrassment in extending and closing or contracting the table. The invention also has for its object strength and durability, together with a greater degree of extension with a given length of slides than hitherto. J. T. Birchard, of Milwaukee, Wis., is the inventor of this improvement.

NEVER SULK.—Better draw the cork of your indignation, and let it foam and fume, than wire it down to turn sour and acrid within. Sulks affect the liver, and are still worse for the heart and soul. Wrath driven in is as dangerous to the moral health as suppressed small-pox is to the animal system. Dissipate it by reflecting on the mildness, humility and serenity of better men than yourself, suffering under greater wrongs than you have ever been called upon to bear.

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ISSUED FROM THE UNITED STATES PATENT-OFFICE

FOR THE WEEK ENDING OCTOBER 20, 1863.

Reported Officially for the Scientific American.

***** Pamphlets containing the Patent Laws and full particulars of the mode of applying for Letters Patent, specifying size of model required, and much other information useful to inventors, may be had gratis by addressing MUNN & CO., Publishers of the SCIENTIFIC AMERICAN, New York.**

40,317.—Scraper.—Horatio Andrews, Fredonia, N. Y.:

I claim the journal boxes, c, at the bottom of the box, A, in combination with the crank axle, C, and wheels, B, constructed and operating in the manner and for the purpose substantially as set forth.

Also, the employment or use of the draught-pole, E, with a forked end, d', and hook, f', in combination with the box, A, chain, d, and double tree, D, all arranged and operating as and for the purpose specified.

[The object of this invention is to produce a scraper which is simple, light, easily handled, which can be used on rough or stony ground as well as on level, smooth land, and which can be readily loaded and unloaded.]

40,318.—Semi-liquid Wax for Sewing Thread.—Isaac Banister, Newark, N. J.:

I claim the compound semi-liquid wax, when made substantially in the manner and for the purpose herein above specified.

40,319.—Breast Pump.—J. H. Beadle, New York City:

I claim, first, The employment or use of the elastic hemisphere, E, in combination with the flanged disk, D, and cup, A, constructed and operating in the manner and for the purpose substantially as herein shown and described.

Second, The valve, e, constructed of a strip of oiled silk or other suitable material and operating in combination with the diaphragm, E, and cup, A, in the manner and for the purpose set forth.

Third, The chamber, d, in the disk, D, arranged to contain some oiled cotton and to protect the valve, e, substantially in the manner specified.

40,320.—Slide for Extension Tables.—J. F. Birchard, Milwaukie, Wis.:

I claim the combination of the bars, B, when double-grooved as shown, with the slides, A, when made with separate adjustable grooved bars, a a, and pieces, b b, and adjusting bolts, c*, all in the manner herein shown and described.

40,321.—Naval Architecture.—John Bowdlear, Roxbury, Mass.:

I claim, first, The constructing a ships' bottom with the series of peculiarly-shaped grooves or channels and ridges or folds as described, said grooves or channels being under-cut and tapering each way from the amidships to the stem and stern, respectively as set forth.

I also claim constructing the ribs of a vessel with the curved portion, f, and series of projecting folds, g g, &c., for the purpose of receiving and serving as a backing to a grooved or furrowed covering or sheathing as described.

40,322.—Machine for Separating from the Stalk and Twisting Woody Fibers.—H. W. Bowen, Providence, R. I.:

I claim a combination consisting of the following elements or their mechanical equivalents, viz :—

First, Machinery for holding and revolving the stalk with an intermittent motion.

Second, Machinery for raising the end of a fiber in order that such may be seized by the nippers or mechanism by which such fiber is to be stripped from the stalk.

Third, Machinery for seizing the fiber and stripping it from the stalk.

Fourth, Machinery for twisting the fiber or fibers, the whole being to operate together, substanstantially as hereinbefore described.

And furthermore, I claim a combination consisting not only of the above-mentioned elements, but machinery substantially as specified, for drawing the fiber or fibers in manner and with respect to the twister as hereinbefore explained.

40,323.—Beehives.—Levi Brown, Pontiac, N. Y.:

I claim, first, The arrangement of adjustable shutters, D, in the bee entrance, C, in combination with the holes, b, substantially as and for the purpose specified.

Second, The hollow opaque button, g, in combination with the ventilating opening, f, substantially as set forth.

Third, The overhanging parts or extensions b*, of the top and bottom parts of the frame arranged relatively to the notched bars and to the sides of the hive, substantially as and for the purpose herein set forth.

40,324.—Dial Telegraphs.—C. T. Chester, New York City:

I claim, first, The circuit breaker in combination with a train of clock work, whereby it is actuated, and a balance wheel whereby its uniform action is secured, substantially as described.

Second, The combination of the needle of a dial telegraph with a circuit breaker actuated by clock work and regulated by a balance-wheel, substantially as described.

Third, The combination of dial keys with a circuit-breaker driven by clock work and regulated by a balance wheel, substantially as described.

Fourth, I claim in combination with the needle of a dial telegraph, the shifting escapement wheel, constantly connected with and actuated by a train of clock work, when arranged to shift from the armature lever pallet of the receiving magnet to the pallet of a balance wheel, controlling and regulating the action of the mechanism for opening and closing the circuit, substantially as and for the purpose described.

40,325.—Crushing Press.—Edgar Chipman, New York City:

I claim, first, The cylindrical or semi-cylindrical head or block, A, provided with the sliding or adjustable weights, C, fitted on arms, a, in connection with a bed, E, all arranged substantially as and for the purpose herein set forth.

Second, The bearings, D, attached to the sides of the head or block, A, in connection with the ways, F', on the bed, E, for the purpose specified.

Third, The ways or guides, E, constructed of two longitudinal adjustable parts, c c, substantially as shown, in combination with the counterpoised head or block for the purpose specified.

Fourth, The buttons, G, attached to the bearings, D, and constructed substantially as shown for the purpose of holding the block in an inclined position when tilted or turned on either end as set forth.

[This invention relates to a new and improved press for crushing or pulverizing substances, and also for giving a rolling pressure, such, for instance, as is required in expressing moisture from articles or substances, and in giving impressions by means of dies, types, &c. The objects of the invention are to obtain a press for the above purposes which will be very effective or have great power, and still be capable of being operated with the greatest facility or by a trifling expenditure of power, and also be capable of being graduated, so that the crushing power may be raised or graduated as circumstances may require.]

40,326.—Fire Door for Stoves.—J. S. Clark and Washington Harris, Philadelphia, Pa.:

We claim the arrangement of the mica in the fire or feed-door of a stove provided with a movable disk or slide and suitable openings, so that the said mica can be either covered or exposed, as occasion may require, without opening the said door, substantially as described for the purpose specified.

40,327.—Bolts.—Wm. J. Clark, Southington, Conn.:

I claim the bolt substantially herein described, constituting a new article of manufacture as herein set forth.

40,328.—Pump.—L. B. Crittenden, Cincinnati, Ohio:

I claim, first, The combination of a hollow piston rod, C, reciprocating cylinder, B, and air-chamber, D, substantially as described.

Second, In combination with the walking beam, F, the cylinders, B1 B2 B3 and B4, and hollow piston rods, C1 C2 C3 and C4, with their curves and basin, substantially as described.

Third, The combination of the hollow piston rod, C, reciprocating cylinder, B, and stationary cylinder, A, substantially as described.

Fourth, In combination with the third claim, the guide rods, e, and collar, f, substantially as described.

Fifth, In combination with reciprocating cylinders, B1 and B3, the rods, p' p', arranged and operating substantially as shown.

Sixth, The combination in a ball valve of a wood or metal cover, substantially as described.

40,329.—Filter and Cooler.—G. B. Davis, Chicago, Ill.:

I claim the filtering chamber, E, provided with the stopper, G, of cork or other suitable substance, in combination with the ice-chamber, B, and cold-water chamber, C, the latter being provided with an opening, c, in the top to receive the stopper, G, and all arranged as and for the purpose specified.

[This invention consists in a novel and improved combination of a water filter and cooler, the parts pertaining thereto being arranged in such a manner that the water will be filtered in a thorough manner and allowed to pass into the cooler without the liability of coming in contact with the ice in the ice-chamber, the different chambers at the same time being rendered very accessible for the purpose of cleaning, &c., when necessary.]

40,330.—Washing Machine.—M. C. Cronk and S. W. Palmer, Auburn, N. Y.:

We claim the fulcrum, U, the lever, H, the collar, L, the ribs, a a, the buttons, P P, the hinged sections, B B, the false bottom, c, the upright, D, the whole constructed and arranged substantially as herein set forth.

40,331.—Railroad Car Coupling.—John Davis, Alleghany City, Penn.:

I claim the arrangement of the flexible jaws, b and c, coupling tongue, m, recess, j, stop, g, springs, h b and r, and chambers, B u and w, the whole being arranged, constructed and operating substantially as herein described and for the purpose set forth.

40,332.—Railroad Car Brake.—John Davis, Alleghany City, Penn.:

I claim the arrangement of the bars, e and f, guide-plates, d, brakes, c, springs, s, levers, p and q, rods, j k m and n, swivel plate, 5, pieces, 07, and braces, v, the whole being constructed, arranged and operating in the manner and by the means herein described, and for the purpose set forth.

40,333.—Musical Instrument.—William Davis, Tamaqua, Pa.:

I claim the arrangement of two or more horizontal sliding bows operating upon two or more sets of strings, with their levers, I, keys, E, lifters, N, coupler, i, treadle, F, and crank, G, with fly-wheel, H, arranged, combined and operated as herein described, for the purpose of producing the musical sounds of the harp and violin.

40,334.—Lamp.—C. T. Day, Newark, N. J.:

I claim the combination with the burner, C, and socket, A, of the tube, D, opening, g, spiral grooves, e, and pins, f, substantially in the manner herein shown and described.

[This invention relates to an improvement in lamp burners, whereby the lamps are rendered capable of being filled or replenished with oil at any time, even when burning, and by a very simple adjustment or manipulation of the burner, none of the parts of the latter requiring to be detached or removed.]

40,335.—Steam Engine.—William Denkmann, Philadelphia. Pa.:

I claim, first, Combining and arranging the screens, b, with pumps, C, and steam-generating chambers, B, substantially as described, for the purpose of injecting water, in the form of spray, uniformly upon the surface of the chambers.

Second, The combination and arrangement of the valve case, E, and valve, F, with the cylinder, A, and a plurality of steam-generating chambers, B, for the purpose of transmitting the steam from the chambers into the cylinder, substantially as described.

Third, Constructing the rotary valve, F, with the induction opening, 13, in connection with the exit openings, 14 15 16 and 17, when combined with and arranged to operate in relation to the case, E, and cylinder, A, for the purpose of supplying the latter with steam, substantially in the manner above described.

Fourth, Constructing the valve, F, with the openings, 18 19 20 and 21, in connection with the openings, 22 23 24 and 25, substantially as represented, when made to operate in connection with the passages, e f, of the cylinder, A, and the openings, 11 and 12, of the case, E, in exhausting the steam from the cylinder, substantially as described.

40,336.—Paper Press.—Wm. R. Dingman, Stuyvesant Falls, N. Y.:

I claim, first, Constructing and employing a press with a series of jaws or corresponding upper or nether metallic plates, J J J J J and L L L L L, all disconnected, so that while the paper is being subjected to the required pressure it may be easily tied into reams or bundles.

Second, The arrangement of the standards, k k k k k, with their plates, L L L L L, operating in combination with i i i i i, with their respective plates, J J J J J, substantially in the manner and for the purpose herein set forth.

Third, The combination and arrangement of the several parts and devices employed to operate the sliding frame, B, or their equivalents, substantially as and for the purpose herein set forth.

40,337.—Platform Scale.—E. S. Fargo, Dixon, Ill.:

I claim the combination and arrangement of the levers, F F G G, with the double or jointed levers, H H', the rod, d, and scale beam, L, all arranged and operating substantially as and for the purpose herein delineated and described.

40,338.—Flask and Bottle.—W. T. Fry, Philadelphia, Pa.:

I claim the neck, A, of the bottle, and the cap, C, both being constructed, adapted and cemented to each other, and arranged for the reception of the screw cap, E, all substantially as set forth.

40,339.—Stair Rod Fastening.—E. A. Goodes, Philadelphia, Pa.:

I claim, first, The levers, B and B', with their camlike projections, c c, constructed and applied to stair rods, substantially as and for the purpose described.

Secondly, In combination with the said levers, B and B', and their camlike projections, c c, I claim the brackets, E, applied to the stairs, substantially as described for the purpose specified.

40,340.—Grain Separators.—Andrew Hunter, Solano Co., Cal.:

I claim the arrangement of the screens, E F G H I K, with the plate, P, for the purpose of more thoroughly separating the grain to be cleaned from grain of larger size, substantially in the manner and for the purpose described.

I also claim affixing to the lower shoes the strips, R, and similar strips, T, in a reversed position on the bottom of the shoe under the screen, M, for the purpose of guiding the grain into the hopper, U, and chaff or small seed into the hopper, V.

I also claim the arrangements in grain-cleaning machines of trays or shoes in two or more sets in combination with the reversed cranks and connecting rods, in the manner and for the purposes set forth.

40,341.—Grate.—Samuel J. Kelly, Pemberton, N. J.:

In combination with the plates, A A a a, grate bars, B, and bar, C, I claim the movable section, A' B, supported at front by means of the flange, a', and at back by the beveled bar, D, resting in a corresponding recess, E E, in the bar, C, when the said movable section extends completely around from the front and top to the lower and rear part of the grate, and all the parts are constructed and arranged in the manner and for the purposes specified.

[By this invention a large aperture in the grate may be opened at will, through which cinders and other refuse are discharged with the greatest facility.]

40,342.—Portable Fence.—Jacob Killian, Marshall, Iowa.

I claim the pickets, D, attached to the rails, A A' A'', by bending the same alternately in reverse directions around the central rail, A'', and securing the same alternately to opposite sides of the top and bottom rails, A A', in connection with the posts, B, attached to one or more of the rails and provided with horizontal bars, C, or rods, E, substantially as and for the purpose herein set forth.

[This invention relates to a new and improved portable fence, such as are designed for temporary use in certain localities and admit of being put up and taken down with facility. The object of the invention is to obtain a simple, economical and durable fence of the kind specified, and one which may be constructed by almost any one familiar with the use of mechanics tools.]

40,343.—Fire Extinguisher.—William Kitson, Lowell, Mass.:

I claim the employment for admitting water to a cotton or other bin to extinguish fire therein, of a valve or cock, which is opened by means of a weight which is set free for the purpose by the ignition of gun powder or other explosive material, operating substantially as herein described.

40,344.—Sawing Machine.—John L. Knowlton, Bordentown, N. J.:

I claim, first, The attaching of the saw frame or sash, H, to a ring, C, fitted within friction rollers, D, and turned or adjusted by means of the sector rack, E, and pinions, F, or their equivalents, substantially as and for the purpose set forth.

Second, Operating the saw frame or sash, H, through the medium of the slide, I, pitman, J, and crank pulley, K, all arranged substantially as described.

[The object of this invention is to obtain a sawing machine of simple construction which may be adjusted or manipulated with the greatest facility for sawing ship and other timber in carved and beveled form.]

40,345.—Thill Coupling for Carriages.—Thomas S. Lambert, Peekskill, N. Y.:

I claim the combination of the caps, D' D, either or both in combination with the bolt, F, in the manner and for the purposes substantially as set forth.

40,346.—Switch for Telegraphs.—James Lewis, German Flats, N. Y.:

I claim, first, The barrel or cylinder, 5, Figures 1, 4, and 8, and its connecting bars, I to XVIII. (as many as may be necessary), or their combined equivalent, when arranged to operate against springs, a r n and c, or their equivalents, in the manner and for the purpose herein before set forth.

Second, I claim the springs, a r n &c., Figures 1 2 3 and 10, or their equivalents (as many as may be necessary), when arranged to act against a barrel 5, and its connecting bars, I to XVIII, or their combined equivalent, substantially in the manner and for the purpose herein before set forth.

Third, I claim the alternate arrangement of the springs a h r g n h' b, as shown in Fig. 2, when used for the purpose substantially as set forth.

Fourth, I claim the notches 13, with the inclined surfaces each side thereof on the springs, a r n, &c., Figures 1 2 3 9 and 10, when arranged and used substantially in the manner and for the purpose set forth.

Fifth, I claim the mode described of limiting the upward movement and of preventing the lateral movement of the springs, a r n, &c., by means of the slot, 11, in the end of each spring, and the hook headed nail, 10, in connection therewith, or their equivalent, when used substantially in the manner and for the purpose set forth.

Sixth, I claim the combination and use of (first) the barrel 5, and its connecting bars, I to XVIII, or their combined equivalent with (second) the springs, a r n, &c., or their equivalents for the purpose substantially as set forth; together with (third) a suitable dial and index for making said barrel, connecting bars and springs or their combined equivalent, practically available for the purpose set forth.

40,347.—Soda Water Apparatus.—John D. Lynde, Philadelphia, Pa.:

I claim the measuring chamber, B, the fountain, D, and the improved valve, f, all constructed and operated substantially as described, also the construction and arrangement of the cock, C, as described, by means of which I am enabled to introduce through hole, h', water or gas, at a given pressure at will.

Also the combination of the fountain, D, with the valve stopper and its use in connection with the apparatus constructed substantially as described for the purpose of being filled and charged with aerated water or any liquid to be held and discharged under pressure.

40,348.—Trunk.—Charles Mayer, New York City:

I claim a trunk, A, having triple sides, a b c, and two bottoms, d d', said sides being connected by slotted screw clamps, C, substantially as and for the purposes herein shown and described.

Also the cavities, h, in the brackets of the clamps, C, as described, to prevent the screws from slipping when the trunk is set.

[This invention consists in a trunk with triple sides and a double bottom, said sides being connected by slotted screw clamps in such a manner that the middle part of each side slides between the inner and outer parts, and the trunk can be enlarged in hight to any desired extent, and if thus enlarged a space or receptacle is formed between the two bottoms, capable to receive such articles as it is desirable to keep separate from the balance of the contents of the trunk.]

40,349.—Strap for Drop-presses.—Charles McBurney, Roxbury, Mass.:

I claim the improved strap or belt for drop-presses composed of several plies of canvas cut diagonally and cemented together with vulcanized india-rubber, as set forth.

40,350.—Fuse for Explosive Shells.—James McIntyre, New York City:

I claim a ball or block cemented upon a tube or opening communicating with the interior of the projectile, and surrounded with fuse powder as set forth, so that the explosion of the projectile will take place when the said ball or block is shaken off its seat, by the projectile striking any object, as specified.

40,351.—Machine for Pegging Boots and Shoes.—Wm. Miller, Boston, Mass.:

I claim the arrangement of the elastic cord, N, and pulley, O, with the tube, K, and follower, M, in the manner herein shown and described.

The combination of the adjustable box, D, and collar, C, with the tube, A, spindle, B, and spring, E, in the manner herein shown and described.

The arrangement of the feed wheel, J, with the tube, A, and the awl, peg-driver and cutter, in the manner herein shown and described, so that said feed wheel will revolve on a plane vertical with said parts, all as set forth.

40,352.—Capstan or Windlass.—Isaac G. Morgan, Ithaca, N. Y.:

I claim the application of the screw and endless nut, in connection with the bevel wheels, socket-bar and hand-wheel to a ship's capstan, boat windlass or rudder, or to any machine where great power is required, substantially as set forth and described; procuring power on the one hand, and velocity on the other.

40,353.—Aero-vapor Burner.—Oscar F. Morrill, Chelsea, Mass.:

I claim the improved aero-vapor burner, as not only constructed with the fluid vaporizing conduit, D, arranged so as to extend across or over the foraminous cap, A, and into the chimney, C, and from thence to pass downward and afterward into the air and vapor mixing chamber, B, but as having that portion of the conduit which is situated immediately over the said cap provided with the tubular arch, D' (or its equivalent), to project upward within the chimney, the same being for the purpose or purposes as hereinbefore specified.

I also claim the improvement of the extension of the conduit, D, downward through the caps, A, and within the air and vapor mixing chamber, in manner substantially as specified.

I also claim the combination of the heater or heat conductor, F, with the aero-vapor burner, and the conduit, D, applied thereto, substantially as described.

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40,354.—Steam Pressure Regulator.—Joseph Nason, New York City:

I claim, first, The employment of the rotating coil, E, dense fluid, F, connection, I, leading from the vessel in which the pressure is to be regulated, and connection, K, leading to a damper or valve adapted to control such pressure, the several parts being arranged substantially in the manner and for the purpose herein set forth.

Second, I claim in connection with the above described rotating coil, the employment of the volute, J, or equivalent means of inducing a self-adjusting variable force opposing the pressure of the steam, substantially as and for the purpose herein set forth.

40,355.—Hoop Skirt.—Caesar Neuman, New York City:

I claim the employment of the self-adjusting waist-band, A, with elastic strips, a a′, in combination with bustle rings, B B′, provided with sliding clasps, b b′, arranged in relation to the strips, a a′, and tapes, D, in the manner and for the purpose substantially as shown and described.

[The object of this invention is to make the waist-band and the bustle-rings of a hoop skirt self-adjustable, according to the varying thickness of the body of the wearer.]

40,356.—Sawing Machine.—Sanford W. Northrop, Albany, N. Y.:

I claim the arrangement of the reciprocating slides, B B′, carrying the feed rollers, C, in combination with the rock shafts, D D′, arms, b′, and set screws, c c′, and with the rod, E, connecting the cranks, d′, the whole constructed and operating in the manner and for the purpose substantially as shown and described.

Also making the rod, E, adjustable toward and from the center of the rock shaft, D, as described so that the motion of the slides, B B′, can be brought in any desired relation toward each other, and the timber cut in two or more parts as specified.

Also the hand screw, F, in combination with the slides, B B′, and rock shaft, D, constructed and operating as and for the purpose set forth.

40,357.—Moulding Artificial Teeth.—James A. Pelton, Middletown, Conn.:

I claim, first, The application of a mold substantially as above described to the formation of a set of six front teeth, in one continuous, curvilinear block.

Second, As an article of manufacture, the production of six artificial teeth, corresponding to the six front teeth of the human jaw, with the gum attached, in one continuous, solid, curvilinear block, by means of a mold, substantially as above described.

40,358.—Watch.—Edward Favre Perret, Locle, Switzerland:

I claim so combining the seconds hand with the fourth or seconds wheel that the seconds hand can be stopped and permanently held or started at pleasure, without affecting the movements of the seconds wheel, substantially as set forth.

40,359.—Grain Drill.—O. M. Pond, Independence, Iowa:

I claim, first, The stationary lip, D′, and hinged lip, D, in combination with the vibrating rake, I, arranged and operating as and for the purpose specified.

Second, I claim the adjusting nut, C′, bolt, B, spring, E, and nut, F, in combination with the lever, G, arranged as and for the purpose described.

40,360.—Washing Machine.—Haskell Preble, Machias, Maine:

I claim the arrangement of the sliding carriage, D, rod, E, levers, F G, and weight, H, with the pressure board, C, and cylinder, B, in the manner herein shown and described.

[This invention consists in the employment or use of a rotating fluted cylinder and a serpentine fluted pressure board arranged with a weight, levers and connecting rod, in such a manner that the clothes may be subjected to a greater or less pressure as desired and cleansed thoroughly and expeditiously without the least injury.]

40,361.—Lamp Shade Supporter.—Christian Reichman, Philadelphia, Pa.:

As an improved article of manufacture I claim a lamp shade supporter with springs, a′ b′, and projections, c, cut at one operation in a single piece out of sheet metal and then bent in annular form with its ends secured by the piece, f, and slots, e e, or other fastening which will admit of the expansion and contraction of the supporter, substantially as and for the purpose herein set forth.

[This invention consists in stamping or cutting the shade supporter in one piece out of a plate of sheet-metal, and in such a manner that it will be straight when first cut, and be capable of being bent in the form of a circle or band and admit of being adjusted to the shade with the greatest facility.]

40,362.—Exploding Torpedoes, Mines, &c.—Swen Eskill Sanborn, Philadelphia, Pa.:

I claim, first, The employment or use for the purpose of exploding torpedoes, &c., of an apparatus, substantially such as herein described, whereby the time when the explosion will take place can be determined and adjusted beforehand with perfect accuracy.

Second, The notched disk, V, lever, W, arm, v, stop, u, cam, Y, trigger, K, and hammer, I, in combination with a clock movement, constructed and operating in the manner and for the purpose substantially as set forth.

Third, The application of the notched disk, V, to the index hand, U, moving on the dial plate, C, substantially as and for the purpose specified.

[An engraving and description of this invention will be published in an early number of the SCIENTIFIC AMERICAN.]

40,363.—Hoop Skirt.—Leopold Sanders, New York City:

I claim the braids or cords, c, in combination with the clasps, D, the above parts being applied to the tapes, B, and all arranged as and for the purpose herein set forth.

[This invention relates to a new and improved means for securing the hoops of the skirt to the tapes, whereby a very firm and strong connection is obtained between the parts aforesaid and all shifting or moving of the same out of their proper relative position effectually prevented.]

40,364.—Machine for Coating Oil Cloth.—Milo Sawyer, Cincinnati, Ohio:

I claim the application of an adhesive, elastic or tractive cylinder, which draws the cloth through the machine or under a scraper, for the purpose of coating cloth in long pieces, as herein above described, thus obviating the necessity of stretching it in frames, or cutting it in short pieces.

40,365.—Grain Drill.—S. C. Schofield, Freeport, Ill.:

I claim, first, The employment or use of the rods, h, attached to the vibrating frame, E, and passing through the perforated plate, d, and bottom of the seed box, D, the rods, h, being provided with leathers, j, and all arranged to operate as and for the purpose set forth.

Second, The arrangement and combination of the bar, G, with the bars, n p, attached to it, standards, g, teeth or plows, H′, lever, I, and bar, s, all arranged as shown, to admit of the adjustment of the teeth or plows, as set forth.

[This invention relates, first, to an improvement in the seed-distributing apparatus, whereby the seed is discharged in an uniform manner and in greater or less quantity on a given area as may be required, and the distribution of the seed stopped entirely at any time at the will of the driver or operator. The invention relates, second, to an improvement in the arrangement of the plows or coverers, whereby the same may be adjusted at any angle required to obtain the proper depth of penetration, and also entirely elevated above the surface of the ground when required to be inoperative.]

40,366.—Heater.—Edwin Sprague, Alleghany City, Pa.:

I claim the arrangement of the pipe, e, register, o, chamber, x, pipe, y, receiving chamber, h, branch, j, damper, r, and vessel, t, the whole being constructed, arranged and operating substantially as herein described and for the purpose set forth.

40,367.—Cultivator.—R. H. Springstead, Constantine, Mich.:

I claim the arrangement of the lever, C, sliding bar, F, its attached teeth, H, and their hinged bar, E, with the hinged bar, I, its attached teeth, lever, h i, and standard, J, all in the manner herein shown and described.

I also claim the arrangement with the hinged bars, E I, axle, C, and wheels, B, of the guards, b c, all operating together in the manner herein shown and described.

[This invention consists in the arrangement of stay bars or guards extending from the ends of the frame outside of the wheels to the ends of the axles, in combination with braces running from the axles to teeth which run outside of the wheels, in such a manner that the wheels are fully protected from lateral obstructions, and at the same time the teeth are enabled to run close up to a fence or to a stump or any other obstruction on the side of the cultivator. The invention consists, further, in the arrangement of a laterally sliding bar with two hinged teeth, in combination with a hinged vertically adjustable bar and suitable hand levers, in such a manner that the driver is enabled to adjust the plows in a lateral and in a vertical direction whenever he finds it necessary to do so.]

40,368.—Lamp.—W. G. Sterling, Bridgeport, Conn.:

I claim the combination of the skeleton bridge, H, with the tube, G, and also in combination with the disk, L, to operate substantially as described.

40,369.—Filter.—Charles Süssner, a citizen of Great Britain residing in the United States:

I claim the arrangement of the two filters or filtering chambers, C C′, with reference to the inlet and outlet pipes extending therefrom and to the chamber, B, and its outlet pipe, d, in the manner and for the purpose substantially as set forth.

I claim also the movable diaphragms, c c′, made to slide in the filtering chamber for packing or loosening the filtering material substantially as described.

40,370.—Machine for making Dough, Paste, &c.—Ebenezer Stevens, London, England. Patented in England Dec. 24, 1862:

I claim the dough-mixer hereinbefore described, composed substantially of prongs secured to a cranked axis or bar, so that it may be readily withdrawn from the dough when the axis is uppermost.

I also claim the combination of a stationary frame to support the gearing by which the dough-mixer is worked with a removable mixing vessel, in such manner that the connection of the gearing with the dough-mixer in the mixing vessel may be disconnected to permit the dough to be conveyed in the mixing vessel to any part of the bakery, substantially as herein set forth.

I also claim the combination of the dough-mixer with a flour hopper and flour agitators, or their equivalent, whereby the flour thrown in mass into the flour hopper is delivered gradually to the mixing vessel during the mixing of the dough, substantially as herein set forth.

I also claim the combination of the flour hopper and its agitators with variable slides to regulate the discharge of flour to the mixing vessel beneath, substantially as herein set forth,

I also claim the combination of the flour hopper and the mixing vessel with a dusting board between the two to distribute the flour into the mixing vessel, substantially as herein set forth.

I also claim the combination of the flour agitators, or other moving appurtenances of the flour hopper, with the dough-mixer, by a removable connection, so that the former may be thrown out of gear when the flour is exhausted, substantially as herein set forth.

I also claim the combination of the dough-mixer with change gearing, so that it may be moved rapidly when the dough is thin and more slowly when the dough becomes tough, substantially as herein set forth.

I also claim the combination of the dough-mixer with duplex gear, at the two ends of the machine, so that an equal motion is communicated to both ends of the dough-mixer simultaneously, substantially as herein set forth.

I also claim the combination of the driving spindles of the dough-mixer at the two ends of the machine with one shifting lever, so that both driving spindles can be simultaneously withdrawn from the dough-mixer, substantially as herein set forth.

I also claim the combination of a mixing vessel fitted with a mixer, with a jacket forming a double bottom, to permit the temperature of the mixing vessel to be varied by the application of water or steam, substantially as herein set forth,

40,371.—Furnace for re-burning Bone-black.—Gottfried Thulemeyer, New York City:

I claim, first, The horse-shoe shaped retorts, C, arranged in the furnace, A, in the manner and for the purpose substantially as herein shown and described.

Second, The partition plate, E, when made whole or in sections, and provided with apertures, b, in combination with the retorts, C, and furnace, A, all constructed and operating substantially as and for the purpose set forth.

Third, The arrangement of one or more series of retorts, C, between two fire-places, B B′, in combination with the particular plate, E, side flues, d e, and end flues, f, all constructed and operating in the manner and for the purpose substantially as specified.

40,372.—Manufacturing Tin Cans.—J. E. Vansant, Louisville, Ky.:

I claim the stationary and movable jaws, A C, provided with the loop clamp, D, and operated through the medium of the levers, E G, or their equivalents, in combination with the former, H, all arranged to operate as and for the purpose herein set forth.

[This invention relates to a new and improved machine for manufacturing cylindrical tin cans, and it consists in the employment of a stationary and movable jaw, having a loop clamp attached to them; the jaw being operated by a treadle and levers, the latter being provided with a weight and all arranged and used in connection with a former.]

40,373.—Signal Apparatus for Railways.—Eugeni Vincenzi, Parma, Italy:

I claim arranging and combining apparatus, substantially as hereinbefore described.

40,374.—Water Elevator.—T. J. Wadleigh, Sutton, N. H.:

I claim the two drums, C C, placed loosely on the shaft, B, connected by gears, as shown, and provided with levers, I I, in combination with the locking device for alternately connecting the drums to the shaft, the same consisting of the pivoted button and plate, H, and the shoulders or projection, f, at the inner ends of the drums.

I further claim the particular manner of operating the levers, I, to unlock or detach the drums from the shaft, B, to wit, by means of the spiral grooves, c c, in the drums, C, with the ropes or chains, d, working thereon, substantially as described.

[This invention consists in the employment of a windlass provided with two loose drums, to each of which a bucket is attached by a rope or chain, said drums being provided each with a gear into which a pinion meshes, and each also provided with a lever; the above parts being used in connection with a locking device, and all arranged in such a manner that, by a continuous movement or rotation of the windlass in one direction, the buckets may be raised and lowered, the two buckets moving in opposite directions, that is to say, one being raised while the other is lowered, and the filled bucket, as it reaches its highest or culminating point, tilted and deprived of its contents.]

49,375.—Heater.—Anton Weller, Albany, N. Y.:

I claim the series of contracted air passages, c′ c c′ c, formed and applied as specified, when combined with the fire pot, A, hollow base, D, ash pit, B, chambers, E F, cylinders, H I, cap, J, and flue, G, all constructed, arranged and operating in the manner and for the purposes herein shown and described.

[This invention consists in arranging a cold-air or air-heating passage with a draught flue and fire chamber, of a stove or air-heating furnace in such a manner that a very efficient heat-radiating and air-heating stove are combined, and the greatest possible amount of heat obtained from a given quantity of fuel.]

40,376.—Gas Blow-pipe.—A. H. Wood, Boston, Mass.:

I claim the employment, in a gas blow-pipe, of one or more reservoirs for containing water or other volatile substance, and provided with a means of heating the same, so as to produce vapor to commingle with the gas and flame for the purpose of intensifying the heat, substantially as described.

I also claim the cap, F, provided with holes, f, and so arranged as to control the admission of air through the holes, e, in the manner and for the purpose substantially as herein described.

40,377.—Paddle-wheel.—Leonard Ames, Wanbeck, Wis., and Melville Miles, Pepin, Wis., assignors to Leonard Ames:

We claim a paddle wheel having its floats or blades constructed of a flat board, C, with a series of parallel blocks, D, attached to it at right angles to said blocks, beyond the board, being of wedge-shape in their transverse section, substantially as and for the purpose set forth.

We further claim having the outer edge of the boards, C, rounded as shown at a, and also the outer and inner ends of the blocks, D, rounded as shown at b d, for the purpose specified.

40,378.—Sugar Evaporator.—David Beasley, Boone Co., Ind., assignor through mesne assignments to T. C. Bartle, Independence, Iowa:

I claim the combination and arrangement of the evaporating pans, B C D, and water dampers, E E E, for the uses and purposes substantially as set forth.

40,379.—Skirt Wire.—William Darker, Jr. (assignor to J. B. Thompson), Philadelphia, Pa.:

I claim skirt wire with a woven covering as a new manufacture, substantially as herein described.

40,380.—Field Roller.—Chester Dunham (assignor to himself and William Heston), Bedford, Ohio:

I claim the rollers, D D, fitted in frames, C C, attached to the box, A, or a suitable frame, as shown, in combination with the roller, H, attached to a box, G, or a suitable frame, which is connected to the frame or box, A, of the rollers, D, by an universal joint, E, all arranged as and for the purposes herein set forth.

[The object of this invention is to obtain a roller for rolling land which will conform to the inequalities of the surface over which it passes, and thereby perform its work in a more thorough manner than those previously constructed.]

40,381.—Curtain Fixture.—E. M. Judd (assignor to H. L. Judd), New Britain, Conn.:

I claim the pin, d, formed with the mortise, l, for receiving the tape, and with the shoulder, 2, for securing the metallic end, c, to the roller, a, as specified.

40,382.—Covering for the Head.—T. S. Lambert, Peekskill, N. Y., assignor to J. O. Wood, Southfield, N. Y.:

I claim the application within a covering for the head, or to any part of wearing apparel, of sand paper, or its equivalent, substantially as and for the purpose described,

40,383.—Apparatus for Stretching Hat Bodies.—T. G. Oakley and W. R. Finch, Brooklyn, N. Y.:

We claim the two blocks, B B, attached to the pivoted arms, C C, and operated through the medium of the cam, H, and spring, D, or their equivalents, substantially as and for the purpose herein set forth.

40,384.—String-bearing for Pianofortes.—R. A. Tooker New York City, assignor to himself and W. B. Bradbury, Bloomfield, N. J.:

I claim the string bearing composed of a screw having its head slotted for the reception of the string or strings and a screw thread, or such slotted head fitted with a nut, for the purpose of securing the parts of the head upon the string or strings, substantially as and for the purpose herein specified.

[This improved string-bearing, which may be employed at either or both ends of the string, and which serves the purposes of securing the string at a proper elevation for accurately regulating the length and direction of the vibrating portion of the string and maintaining a proper distribution of the scale, consists of a screw having a thread on its stem or body, by which to secure it in the sound-board bridge or to the sound board itself without the use of the bridge, or in the wrest plank or wrest-plank bridge, and a slotted head having a screw thread on the exterior, for the reception of a nut by which to clamp the string or strings within the slot or slots, in such manner as to give them a firm and durable bearing both above, below and on both sides.

40,385.—Projectile for Fire-arms.—O. G. Warren (assignor to Joshua Barnes), New York City:

I claim the combination of the false powder chamber and the hollow shot, to hold all the charge, and to sustain the greater part of the shock of the explosion, in the manner described.

40,386.—Grinding and smoothing Shot and Shell.—Jarvis Williams (assignor to E. T. Trofitter), Boston, Mass.:

I claim, first, The adjustable frame, F, provided with the concave rollers, G G, in combination with any suitable grinding or polishing wheel, D, substantially as set forth and for the purpose described.

Second, Making the rollers, G, in two parts, capable of turning in opposite directions, substantially as and for the purpose described.

DESIGNS.

1,834.—Reel.—Emma C. Wooster, New York City.

1,835.—Plates of a Parlor Stove.—Isaac De Zenche (assignor to Bridge, Beach & Co.), St. Louis, Mo.

1,836.—Cooking Stove.—Isaac De Zenche (assignor to Bridge, Beach & Co.), St. Louis, Mo.

TO OUR READERS.

PATENT CLAIMS.—Persons desiring the claim of any invention which has been patented within thirty years, can obtain a copy by addressing a note to this office, stating the name of the patentee and date of patent, when known, and inclosing $1 as fee for copying. We can also furnish a sketch of any patented machine issued since 1853, to accompany the claim, on receipt of $3. Address MUNN & CO., Patent Solicitors, No. 37 Park Row, New York.

Models are required to accompany applications for Patents under the new law, the same as formerly, except on design patents when two good drawings are all that are required to accompany the petition, specification and oath, except the Government fee.

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NEW PAMPHLETS IN GERMAN.—We have just issued a revised edition of our pamphlet of *Instructions to Inventors*, containing a digest of the fees required under the new Patent Law, &c., printed in the German language, which persons can have gratis upon application at this office. Address MUNN & CO.,

No. 37 Park-row, New York.

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IMPORTANT TO INVENTORS.

PATENTS FOR SEVENTEEN YEARS.

MESSRS. MUNN & CO., PROPRIETORS OF THE SCIENTIFIC AMERICAN, continue to solicit patents in the United States and all foreign countries, on the most reasonable terms. They also attend to various other departments of business pertaining to patents, such as Extensions, Appeals before the United States Court, Interferences, Opinions relative to Infringements, &c. The long experience Messrs. MUNN & Co. have had in preparing Specifications and Drawings has rendered them perfectly conversant with the mode of doing business at the United States Patent Office, and with the greater part of the inventions which have been patented. Information concerning the patentability of inventions is freely given, without charge, on sending a model or drawing and description to this office.

THE EXAMINATION OF INVENTIONS.

Persons having conceived an idea which they think may be patentable, are advised to make a sketch or model of their invention, and submit it to us, with a full description, for advice. The points of novelty are carefully examined, and a written reply, corresponding with the facts, is promptly sent free of charge. Address MUNN & CO., No. 37 Park Row, New York.

PRELIMINARY EXAMINATIONS AT THE PATENT OFFICE.

The service we render gratuitously upon examining an invention does not extend to a search at the Patent Office, to see if a like invention has been presented there, but is an opinion based upon what knowledge we may acquire of a similar invention from the records in our Home Office. But for a fee of $5, accompanied with a model of drawing and description, we have a special search made at the United States Patent Office, and a report setting forth the prospects of obtaining a patent, &c., made up and mailed to the inventor, with a pamphlet, giving instructions for further proceedings. These preliminary examinations are made through our Branch Office, corner of F and Seventh streets, Washington, by experienced and competent persons. Many thousands of such examinations have been made through this office. Address MUNN & CO., No. 37 Park Row, New York.

HOW TO MAKE AN APPLICATION FOR A PATENT.

Every applicant for a patent must furnish a model of his invention if susceptible of one; or, if the invention is a chemical productions he must furnish samples of the ingredients of which his composition consists, for the Patent Office. These should be securely packed, the inventor's name marked on them and sent, with the Government fees, by express. The express charge should be pre-paid. Small models from a distance can often be sent cheaper by mail. The safest way to remit money is by a draft on New York, payable to the order of MUNN & CO. Persons who live in remote parts of the country can usually purchase drafts from their merchants on their New York correspondents; but, if not convenient to do so, there is but little risk in sending bank-bills by mail, having the letter registered by the postmaster. Address MUNN & CO., No. 37 Park Row, New York.

The revised Patent Laws, enacted by Congress on the 2d of March, 1861, are now in full force, and prove to be of great benefit to all parties who are concerned in new inventions.

The duration of patents granted under the new act is prolonged to SEVENTEEN years, and the Government fee required on filing an application for a patent is *reduced* from $30 to $15. Other changes in the fees are also made as follows:—

On filing each Caveat	$10
On filing each application for a Patent, except for a design	$15
On issuing each original Patent	$20
On appeal to Commissioner of Patents	$20
On application for Re-issue	$30
On application for Extension of Patent	$50
On granting the Extension	$50
On filing a Disclaimer	$10
On filing application for Design, three and a half years	$10
On filing application for Design, seven years	$15
On filing application for design, fourteen years	$30

The law abolishes discrimination in fees required of foreigners, excepting natives of such countries as discriminate against citizens of the United States—thus allowing Austrian, French, Belgian, English, Russian, Spanish and all other foreigners except the Canadians, to enjoy all the privileges of our patent system (but in cases of designs) on the above terms. Foreigners cannot secure their inventions by filing a caveat; to citizens only is this privilege accorded.

During the last seventeen years, the business of procuring Patents for new inventions in the United States and all foreign countries has been conducted by Messrs. MUNN & CO., in connection with the publication of the SCIENTIFIC AMERICAN; and as an evidence of the confidence reposed in our Agency by the inventors throughout the country we would state that we have acted as agents for at least TWENTY THOUSAND inventors! In fact, the publishers of this paper have become identified with the whole brotherhood of inventors and patentees at home and abroad. Thousands of inventors for whom we have taken out patents have addressed to us most flattering testimonials for the services we have rendered them, and the wealth which has inured to the inventors whose patents were secured through this office, and afterwards illustrated in the SCIENTIFIC AMERICAN, would amount to many millions of dollars! We would state that we never had a more efficient corps of Draughtsmen and Specification Writers than those employed at present in our extensive offices, and we are prepared to attend to patent business of all kinds in the quickest time and on the most liberal terms.

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We are prepared to undertake the investigation and prosecution of rejected cases on reasonable terms. The close proximity of our Washington Agency to the Patent Office affords us rare opportunities for the examination and comparison of references, models, drawings, documents, &c. Our success in the prosecution of rejected cases has been very great. The principal portion of our charge is generally left dependent upon the final result.

All persons having rejected cases which they desire to have prosecuted, are invited to correspond with us on the subject, giving a brief history of the case, inclosing the official letters &c.

CAVEATS.

Persons desiring to file a caveat can have the papers prepared in the shortest time by sending a sketch and description of the invention. The Government fee for a caveat, under the new law, is $10. A pamphlet of advice regarding applications for patents and caveats, printed in English and German, is furnished gratis on application by mail. Address MUNN & CO., No. 37 Park Row, New York.

FOREIGN PATENTS.

We are very extensively engaged in the preparation and securing of patents in the various European countries. For the transaction of this business we have offices at Nos. 66 Chancery lane, London; 29 Boulevard St. Martin, Paris; and 26 Rue des Eperonniers, Brussels. We think we can safely say that THREE-FOURTHS of all the European Patents secured to American citizens are procured through the Scientific American Patent Agency, No. 37 Park Row, New York.

Inventors will do well to bear in mind that the English law does not limit the issue of patents to inventors. Any one can take out a patent there.

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Assignments of patents, and agreements between patentees and manufacturers are carefully prepared and placed upon the records at the Patent Office. Address MUNN & CO., at the Scientific American Patent Agency, No. 37 Park Row, New York.

It would require many columns to detail all the ways in which inventors or patentees may be served at our offices. We cordially invite all who have anything to do with patent property or inventions to call at our extensive offices, No. 37 Park Row, New York, where any questions regarding the rights of patentees will be cheerfully answered.

Communications and remittances by mail, and models by express (prepaid), should be addressed to MUNN & CO., No. 37 Park Row, New York.

Notes and Queries

H. C. J., of N. J.—The lathe you speak of is a good one for the purpose for aught we know to the contrary.

O. T. B., of Pa.—Construct your boiler passages with bridge walls, and you will obtain better results than if not so fitted.

U. S., of Mich.—The typographical error in your article is not important, although we regret it, and are careful that no such irregularities occur.

A. S., of Vt.—We are not in possession of the information you desire to obtain in regard to prices of barrel headings, profits, &c. It would require a great deal of time to obtain it, and we are not disposed to undertake it. Harrison, of New Haven, manufactures a good portable grinding mill. We believe also that those made by the other parties named are good mills.

S. F. P., of Mass.—We do not know of any good machine for cutting down standing wood, but if you want a sawing machine for cutting wood into lengths, you can procure one from F. J. Richmond, Ashford, Conn.

N. C. S., of U. S. A.—The idea of operating an engine by successive explosions of powder is not new. It is possible that the construction of your engine differs from those heretofore made, and if you desire, we can determine this question by an examination in Washington, upon receipt of the usual fee of $5. When you write to us again give us your full address.

E. H. W., of Wis.—Such a work as you desire on hominy mills and grain elevators has not yet been published.

J. N., of Maine.—We do not know of any treatise or manual published on book-binding; we are pleased to see that you manifest a desire to keep up with the improvements of the day. Such a course cannot fail to result advantageously to you.

W. H. H. & Co., of Ohio.—To melt your zinc and prevent it from evaporizing, it being a very volatile metal, you should cover its surface, in the vessel in which it is melted, with soot or pulverized charcoal. To reduce the oxide of zinc to a metallic state it is mixed with one-eighth of its weight of ground charcoal, and distilled in an iron retort shaped like a kitchen round pot.

G. F. W., of N. Y.—You will find a description of Professor Henry's electro-magnetic mechanism on page 560 of Booth's "Encyclopedia of Chemistry;" and you will find an illustrated description of Dr. Page's electro-magnetic engine on page 65, Vol. VII. (old series) of the SCIENTIFIC AMERICAN. It is formed with a hollow helice for the movement of a piston without visible support therein. You will also find an illustrated history of electro-magnetic engines on page 68 of the same volume. The force with which an iron bar can be drawn into a hollow magnetic helice for a distance of 12 inches depends on the strength of the battery and other circumstances. It was claimed that Professor Page's engine was of five horse-power.

G. S. L., of N. H.—The best way to become a mechanical engineer is to apprentice yourself to a machinist, and learn the use of tools thoroughly; in the meantime study all the mathematical works you can get hold of, also natural philosophy and such other sciences as you can find time for. Learn the trade first and then study afterward, or in connection with it. In that way you cannot fail with ability to become a good engineer.

E. M. T., of N. Y.—We have published in the back volumes of our journal engravings of a large number of artificial legs. We refer you to our files, which you are at liberty at any time to examine in the office.

A. W., of Conn.—Correspondents who write to us for favors cannot expect to receive answers unless they sign their names to their letters. We cannot recommend any composition for the purposes you name.

A. W. A., of Mass.—Chester Bros., 104 Center street, this city, manufacture very convenient batteries for electro-plating. Communicate with them respecting what you want. We do not deal in such articles ourselves.

N. S., of Pa.—Your business is progressing as rapidly as possible. We always keep applicants for patents made through our agency well informed of the progress of their cases.

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At the Scientific American Office, on account of Patent Office business, from Wednesday, Oct. 21, to Wednesday, Oct. 28, 1863:—

S. H., of N. Y., $25; J. M., of Cal, $25: H. & H., of N. Y., $25; V. & M., of N. Y., $25; S. W. H. W., of N. Y., $41; E. M., of N. Y. $20; J. G. P., of R. I., $75; W. T. A., of N. Y., $10; S. E. T., of N. J., $20; H. & K., of Ind, $20; W. D., of Ind., $20; A. S. L., of N. Y., $41; H. B., of Pa., $20; H. F. & T. R. B., of Iowa, $20; H. G., of N. Y., $20; S. B., of N. Y., $36; G. B. F., of N. Y., $16; J. M., of Conn., $16; I. K. B., of Ohio, $16; J. E. T., of Mass., $16; W. M. R., of Ind, $61; R. S. H., of Iowa, $25; S. R. M., of Pa., $121; B. & B., of Mo., $16; O. & F., of Mass., $17; L. E. P., of Mich., $15; H. & E., of Mass., $16; G. T., of Madeira, $50; V. T. P., of Ill., $12; L. A. F., of N. Y., $36; G. F., of N. Y., $25; H. T. M., of N. Y., $25; J. D., of N. J., $25; H. S. L., of Mo., $25; I. R., of D. C., $44; T. M., of N. Y., $20; W. W., of Conn., $44; H. L., of N. Y., $20; P. H., of N. Y., $16; E. C. B., of Cal., $20; G. C., of N. Y., $16; W. D. H., of La., $58; L. H., of Hungary, $16; W. H. B., of N. Y., $45; J. H. K., of La., $20; R. T., of N. Y., $22; J. B. B., of N. Y., $16; T. H. M., of Mass., $25; A. C. E., of Mass., $16; D. S. S., of Ind., $28; J. M. F., of Ohio, $16; J. H. P., of Pa., $22; J. A., of Pa., $25; B. L., of Vt., $362; H. M., of Ill, $16; M. & H., of N. Y., $15; C. H. G., of Mass., $15; P. F. C., of Val., $24; J. T., of N. Y., $56; T. F. B., of N. Y., $20; J. H. C., of Ky., $20; T. L. C., of N. Y., $20; T. B., of Ohio, $20; J. W. R., of N. Y., $66; A. K., of Pa., $20; T. H., of N. Y., $16; H. L., of N. J., $16; H. & D., of N. Y., $16; H. M., of N. Y., $20; G. C. K., of N. Y., $15; L. & G., of Pa., $45; T. F. B., of N. Y., $16; J. D. H., of Pa., $30; F. J. R., of Conn., 25; H. & S., of Ill., $25; J. C., of Ohio, $21; D. E. H., of Nevada, $100; W. E. W., of N. Y., $25; T. & T., of N. Y., $150; J. A., Jr., of Ill., $16.

Persons having remitted money to this office will please to examine the above list to see that their initials appear in it, and if they have not received an acknowledgement by mail, and their initials are not to be found in this list, they will please notify us immediately, and inform us the amount, and how it was sent, whether by mail or express.

Specifications and drawings and models belonging to parties with the following initials have been forwarded to the Patent Office, from Wednesday, Oct. 21, to Wednesday, Oct. 28, 1863:—

L. A. F., of N. Y.; H. T., of N. Y.; H. S. L., of Mo.; R. T., of N Y.; D. S. S., of Ind.; J. A., of Pa; C. H. G., of Mass.; S. H., of N. Y.; H. & H., of N. Y.; S. W. H. W., of N. Y.; W. E. W., of N. Y.; F. J. R., of Conn.; R. S. H., of Iowa; J. H. P., of Pa.; J. T., of N. Y.; G. F., of N. Y.; J. D., of N. J.; I. R., of D. C.; S. G. T., of Md.; F. H. M., of Mass; H. & S., of Ill.; T. F. C., of Va.; J. M., of Cal.; V. & M., of N. Y.; S. B., of N. Y.

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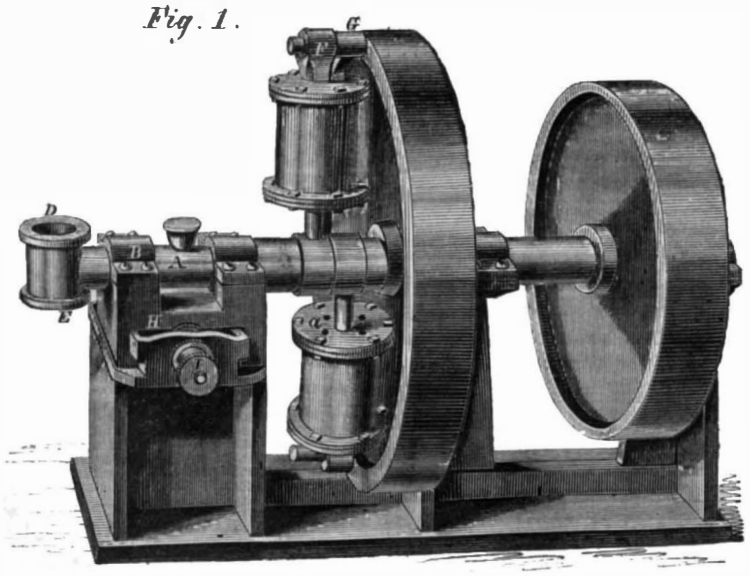
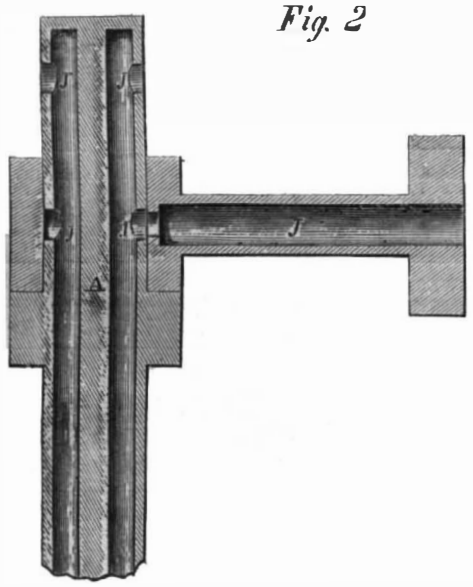
Fig. 1.



JUDD'S REVOLVING CYLINDER ENGINE.

which expands against the upper cylinder head, and forces the piston down; the shaft, A, being out of line or offset with the fly-wheel, acts as a crank, and thus gives an impulse to the wheel. The fly-wheel shaft, and that one about which the rods revolve, are not connected, of course, and the cylinders exhaust their contents as they pass ports constructed for the purpose in the lower part of the shaft, A. The steam pipe is connected at D, and the exhaust at E. It will be seen by referring to the engraving that the cylinders are not permanently fastened to the fly-wheel, but that they have lugs, F, by which they are suspended from the bearings, G, thus permitting

Fig. 2



a free vibration of the cylinder; this is one of the points claimed in the patent. The stroke of the piston can be varied by moving the bearings, B, in or out, they being fitted to a sliding carriage, H, and supplied with a screw and hand-wheel, I, for the purpose of adjustment. Steam is admitted to the cylinders on one side of the piston only; atmospheric pressure is admitted to the other side through the four holes, *a*, in the cylinder head. The operation is readily understood by examining the engraving, as the cylin-

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